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NAS PENSACOLA
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SAMPLING AND ANALYSIS PLAN FOR THE SUPPLEMENTAL SITE ASSESSMENT AT SITE 22 NAS PENSACOLA FL

12/1/2006

TETRA TECH NUS

Comprehensive **L**ong-term **E**nvironmental **A**ction **N**avy

CONTRACT NUMBER N62467-04-D-0055

Rev. 0
12/20/06

Sampling and Analysis Plan
for the
Supplemental Site Assessment
at
Underground Storage Tank (UST) Site 22
(Former Installation Restoration Site 21)

Naval Air Station Pensacola
Pensacola, Florida

Contract Task Order 0056

December 2006

NAVFAC
Naval Facilities Engineering Command
Southeast
2155 Eagle Drive
North Charleston, South Carolina 29406

TETRA TECH NUS, Inc.

SAMPLING AND ANALYSIS PLAN
FOR THE
SUPPLEMENTAL SITE ASSESSMENT
AT
UNDERGROUND STORAGE TANK (UST) SITE 22
(FORMER INSTALLATION RESTORATION SITE 21)

NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA

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CONTRACT NO. N62467-04-D-0055
CONTRACT TASK ORDER 0056

DECEMBER 2006

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ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirements
AST	aboveground storage tank
AVGAS	aviation gasoline
bls	below land surface
BTEX	benzene, toluene, ethylbenzene, total xylenes
°C	degrees Celsius
CAR	Contamination Assessment Report
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLEAN	Comprehensive Long-term Environmental Action Navy
CLP	Contract Laboratory Program
CTL	cleanup target level
CTO	Contract Task Order
DPT	direct-push technology
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FID	flame ionization detector
HASP	Health and Safety Plan
HCl	hydrochloric acid
HNO_3	nitric acid
ID	inside diameter
IDW	investigation-derived waste
IR	Installation Restoration
mL	milliliter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAS	Naval Air Station
NAVFAC SE	Naval Facilities Engineering Command, Southeast
NEESA	Naval Energy and Environmental Support Activity
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NTU	nephelometric turbidity unit
OD	outside diameter
oz	ounce
PAH	Polynuclear Aromatic Hydrocarbon
PVC	polyvinyl chloride

ACRONYMS (CONTINUED)

RAP	Remedial Action Plan
RBCA	Risk-based Corrective Action
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SSAR	Supplemental Site Assessment Report
TAL	Target Analyte List
TCL	Target Compound List
TRPH	total recoverable petroleum hydrocarbon
TtNUS	Tetra Tech NUS, Inc.
UCL	Upper Confidence Limit
UST	underground storage tank
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

Tetra Tech NUS, Inc., (TtNUS) under contract to the Department of Navy, Naval Facilities Engineering Command Southeast (NAVFAC SE) is submitting this Sampling and Analysis Plan (SAP) for Supplement Site Assessment at Underground Storage Tank (UST) Site 22 (Former Installation Restoration (IR) Site 21), Naval Air Station (NAS) Pensacola, Florida. This SAP was prepared under the Comprehensive Long-term Environmental Action Navy (CLEAN) IV Contract Number N62467-04-D-0055, Contract Task Order (CTO) 0056.

1.1 FACILITY BACKGROUND

NAS Pensacola (Figure 1-1) is located in Escambia County, in Florida's northwest coastal area, approximately five miles west of the Pensacola City limits. The approximately 5,000-acre installation was constructed in the 1800's. Prior to construction, the facility was undeveloped and sparsely vegetated. Land use at NAS Pensacola consists of various military housing, training, and support facilities as well as large industrial complexes for major repairs and refurbishment of aircraft engines and frames. Additional details on the NAS Pensacola facility may be found in the facility administrative record.

1.2 PURPOSE OF THE SAP

This SAP serves as a guide and documents the procedures for field activities and sample analyses for the field sampling activities to be conducted at Site 22. The SAP specifies the sampling protocol and procedures for data collection and sample analysis, sampling areas, frequency of samples to be collected, sample designations, sample handling, sampling equipment, and handling of investigation-derived waste (IDW). This plan was prepared in accordance with the TtNUS Corporate Quality Assurance Program Manual, dated January 1, 2001, and the Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOP) for field activities dated February 1, 2004.

The field activities for the supplemental site assessment will include the collection of samples from subsurface soil and groundwater for submission to a National Environmental Laboratory Accreditation Program (NELAP)-certified laboratory for analysis. The data collected during the field activities will be used in preparing a Supplemental Site Assessment Report (SSAR).

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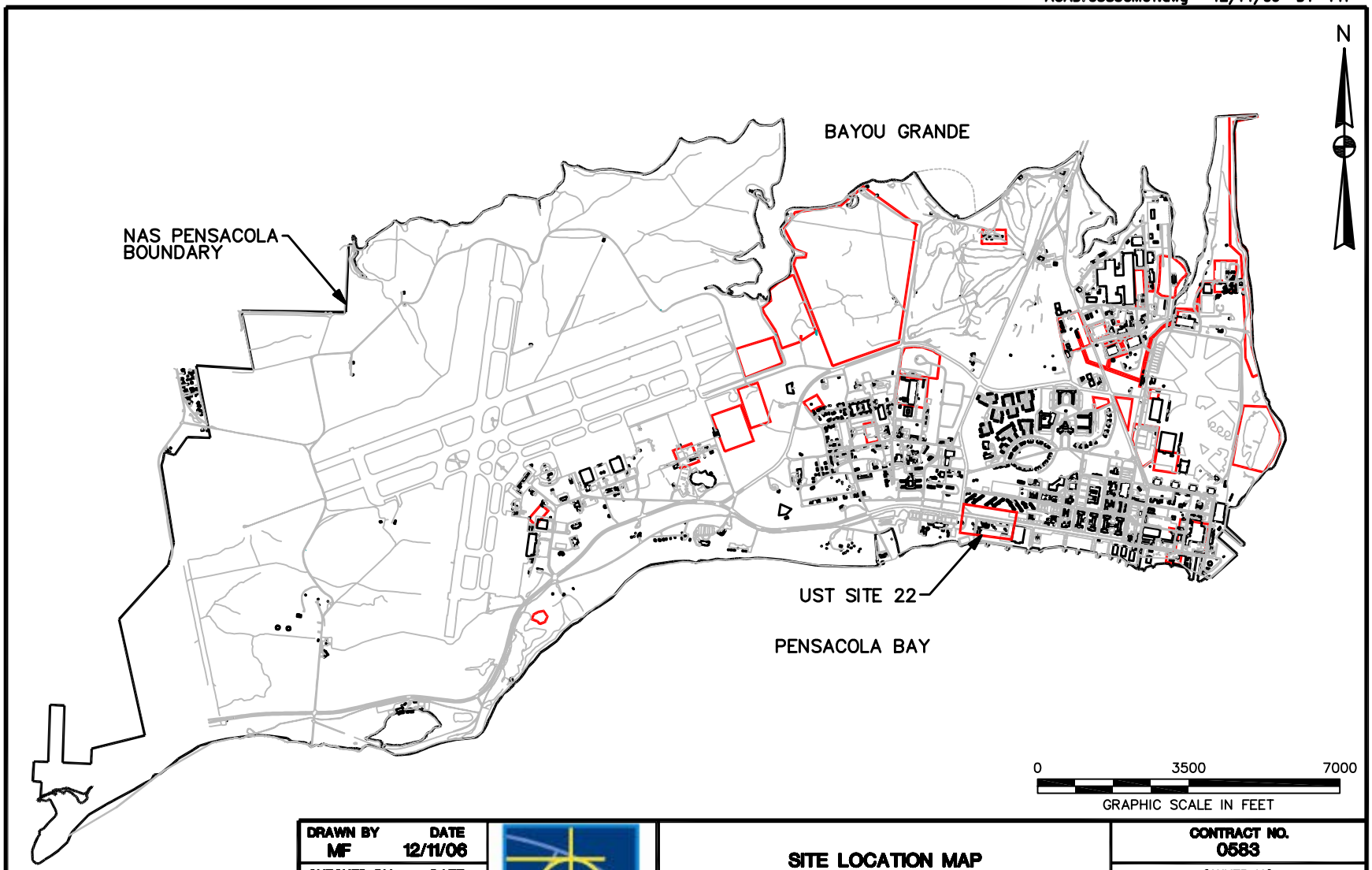

DRAWN BY: MF	DATE: 12/11/06	SITE LOCATION MAP UST SITE 22 SAMPLING ANALYSIS PLAN NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NO.: 0583
CHECKED BY	DATE		OWNER NO.
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1.3 REPORT ORGANIZATION

The SAP is organized into seven sections with supporting references and attachments. Below is a list of the sections and a brief description of their purpose:

- Section 1.0 – Presents the facility background and purpose.
- Section 2.0 – Summarizes site description and previous investigations.
- Section 3.0 – Presents the site-specific investigation discussion.
- Section 4.0 – Presents the investigative methodology for conducting the assessment.
- Section 5.0 – Addresses the waste resulting from investigation activities.
- Section 6.0 – Indicates information to be included in the SSAR.
- Section 7.0 – Addresses the project schedule.
- References.
- Supporting field forms and Site Specific Health and Safety Plan.

2.0 PREVIOUS INVESTIGATIONS

2.1 SITE DESCRIPTION AND HISTORY

Site 22 is the former location of a aviation gasoline (AVGAS) tank farm (Figure 2-1). From approximately 1940 to the late 1960s, nine above-ground storage tanks (ASTs) were used to store AVGAS at the site. The tanks were routinely cleaned and the sludge from the bottom of the tanks was disposed of on the ground surface in the immediate vicinity of the tanks. The ASTs have been removed from the site and the majority of the site is currently grass covered. Building 670, which is a fuel system pump house, is located at the eastern edge of the site, south of Radford Boulevard. Two USTs for contaminated fuel were reportedly associated with Building 670.

2.2 PREVIOUS INVESTIGATIONS

Previous investigations at the site include the Phase I Installation Restoration (IR) assessment conducted in 1991 and the Contamination Assessment conducted in December 1995 and January 1997. In June 1997, the NAS Pensacola Navy Public Works Center submitted the Contamination Assessment Report (CAR) based on the findings of these investigations.

Upon review of the CAR prepared by the Navy, the FDEP issued a technical review letter (August 25, 1997), which requested additional site assessment in order to meet the requirements of Chapter 62-770, Florida Administrative Code (FAC). The CAR addendum investigation was conducted from May to July 2000. Areas of the site were identified where petroleum constituent concentrations in site soil or groundwater exceeded regulatory criteria. Based on the additional site assessment data, the CAR Addendum Report recommended additional soil delineation and groundwater monitoring at the site. On April 20, 2001, FDEP issued a technical review letter agreeing with the recommendations in the CAR Addendum and requesting that additional assessment be conducted at the site before preparation of the Remedial Action Plan (RAP).

In April 2003, TtNUS submitted a Supplemental Site Assessment Letter Report to document field activities completed between October 2002 and February 2003. The field activities included drilling of 33 soil borings for soil head space screening and soil sample collection and installation of 12 monitoring wells for groundwater sampling.

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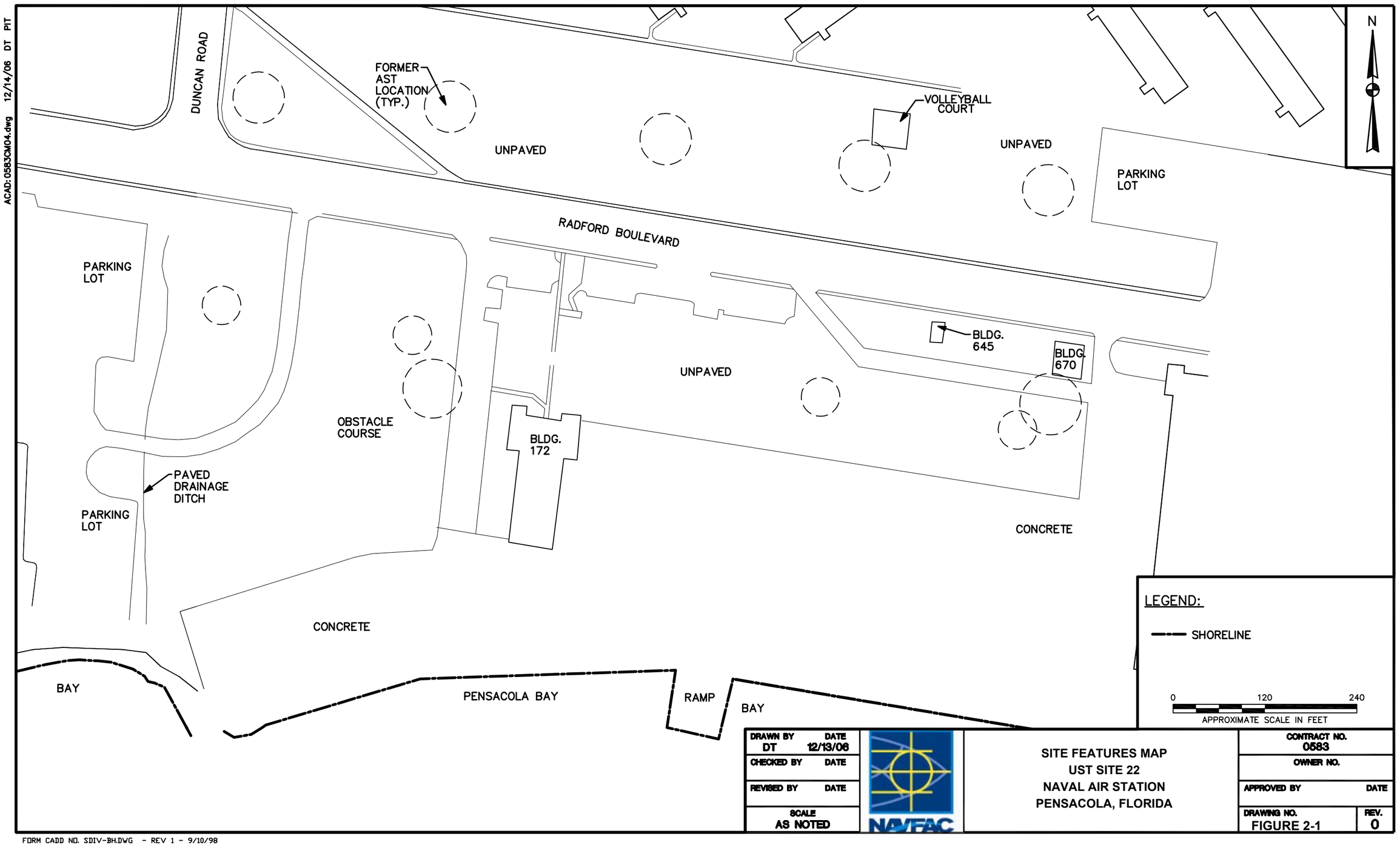

DRAWN BY DT	DATE 12/13/06	SITE FEATURES MAP UST SITE 22 NAVAL AIR STATION PENSACOLA, FLORIDA	CONTRACT NO. 0583
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Based on the results of the site assessment activities, the report recommended that additional site assessment be conducted, and it should be designed to further delineate:

- The extent of total recoverable petroleum hydrocarbon (TRPH) in soil/groundwater at the west end of the site, south of Radford Boulevard
- The extent of TRPH in groundwater in the vicinity of MW-39
- The extent of polynuclear aromatic hydrocarbons (PAHs) in the soil in the vicinity of SB29
- The extent of lead in groundwater in the vicinity of MW-43

Following the further delineation indicated above, a RAP will likely be required to address the dissolved lead contamination in groundwater that appears to originate north of Radford Boulevard at the eastern end of the site.

In addition, the report recommended that status of the fuel distribution pipelines and the reported contaminated fuel USTs associated with Building 670 be evaluated along with groundwater discharging to the paved ditch at the west end of the site to determine if petroleum constituents in site groundwater are being released to surface water.

Since submittal of the Supplemental Site Assessment Letter Report additional field investigation activities have been completed by TtNUS at the site. However, the findings have not been formally documented and will be included in the report for this investigation. It should be noted, that previously the additional field investigation activities were delayed as a result of Hurricane Ivan, which had landfall on September 13, 2004 and resulted in base closure and delays during facility reconstruction activities.

3.0 TECHNICAL APPROACH

3.1 OVERVIEW

Site 22 is a designated UST site and supplemental site assessment will be completed in general accordance with FDEP Petroleum Contaminated Site Cleanup Criteria Chapter 62-770, FAC. All field activities (including soil sampling, monitoring well installation, and groundwater sampling) will be conducted in general accordance with FDEP SOPs for Field Activities (FDEP, 2004). In the event the FDEP SOPs do not address a specific task, TtNUS will defer to the TtNUS Corporate SOPs (TtNUS, 2004).

3.2 SAMPLING AND ANALYSIS PLAN

Soil and groundwater samples will be collected at Site 22. Soil borings will be advanced by hand auger or direct-push technology (DPT) and both soil and groundwater samples will be collected. Soil gas headspace and additional field screening observations will be used to determine the samples are submitted to an on-site mobile laboratory. One or more soil samples per soil boring will be submitted to the mobile laboratory as well as one groundwater sample per location. Samples will be selected for off-site confirmation analysis based on the results of the on-site mobile laboratory analysis. The TtNUS staff will also compare the mobile laboratory analytical results to the soil and groundwater cleanup target levels (CTLs) in Chapter 62-777, FAC.

3.2.1 Soil Sampling Plan

The surface and subsurface soil samples will be collected at Site 22 to further delineate the extent of groundwater contamination. Soil borings for sample collection will be completed in the two shaded areas shown on Figure 3-1. Up to 45 soil borings will be advances to a depth of 10 feet below land surface (bls). The exact soil boring locations will be determined in the field based on results of field screening activities. The initial locations will be determined by previous analytical results and once field work starts, locations will be modified based soil gas headspace screening using a flame ionization detector (FID) and the data from the on-site mobile laboratory. Because many of the soil contaminants detected during the initial assessment do not readily volatilize, field observations such as staining of soil and/or odor are other important factors in choosing laboratory samples.

The soil samples will be collected using hand augers and stainless steel bowls and spoons from discrete intervals (6-inches to 2 feet bls, 2 feet to 4 feet bls, and 4 feet to 6 feet bls). The surface interval from 0 to 6 inches bls will not be collected because following Hurricane Ivan cleanup operations, the facility removed the surface material at the site and brought in additional beach sand and fill material for a

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DUNCAN ROAD

FORMER AST LOCATION (TYP.)

UNPAVED

SB48

VOLLEYBALL COURT

UNPAVED

PARKING LOT

SB57

RADFORD BOULEVARD

N

PARKING LOT

SB01 SB02 SB03 SB04 SB05 SB06 SB07 SB08 SB09 SB10 SB11 SB12 SB13 SB14 SB15 SB16 SB17 SB41 SB42 SB43 SB49 SB50 SB51

SB18 SB19 SB20 SB21 SB22 SB23 SB39 SB40

HS10 HS08 HS07 HS01 HS02 HS03 HS06 HS09 HS54 HS11 HS05

OBSTACLE COURSE

BLDG. 172

UNPAVED

BLDG. 645

SB47

BLDG. 670

SB38 SB37 SB36 SB24 SB27 SB29 SB26 SB46 SB53 SB25 SB55 SB35 SB28 SB32 SB31 SB34 SB30 SB56 SB45 SB33

CONCRETE

PAVED DRAINAGE DITCH

PARKING LOT

CONCRETE

BAY

PENSACOLA BAY

RAMP

BAY

LEGEND:

- PROPOSED INVESTIGATION AREA
- SOIL BORING LOCATION
- SOIL BORING LOCATION—NO LABORATORY ANALYSIS
- HAND AUGER (SAMPLED IN MAY 2000)
- SHORE LINE

0 120 240

APPROXIMATE SCALE IN FEET

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SCALE AS NOTED	

NAVFAC

PROPOSED DPT SOIL AND GROUNDWATER INVESTIGATION AREA
UST SITE 22
SAMPLING ANALYSIS PLAN
NAVAL AIR STATION
PENSACOLA, FLORIDA

CONTRACT NO. 0538	
OWNER NO.	
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naturalized landscaping project. Efforts will be made in the field to sample below this imported, non-representative material. It is anticipated that the soil sampling depth will be limited to 6 feet bls due to the presence of groundwater. Previously groundwater measurements indicated the groundwater potentiometric surface to be present approximately 6 to 8 feet bls. Soil samples will only be collected from above the saturated zone of the water table. Soil samples will be collected in accordance with FDEP SOP FS 3200, Subsurface Soil Sampling (FDEP, 2004) and the sampling methodology will be compliant with FDEP's Global Risk-based Corrective Action (RBCA) Rule 62-780, including section 62-780.600(5) (c) 1, which describes how to conduct soil sampling when the remedial approach for the surface soil is proposed to be 95 percent upper confidence limit (UCL).

The soil samples collected at Site 22 will be analyzed on site by a mobile laboratory for parameters including: benzene, toluene, ethylbenzene, and total xylenes (BTEX) and naphthalene. The data obtained from the on-site mobile laboratory will be used to determine the soil boring progression as well as the eventual placement of the new monitoring wells. In addition, approximately 10 percent of the samples will be sent to an off-site laboratory for confirmation analysis. The confirmation analysis will include volatile organic compounds (VOCs) and methyl tert-butyl ether (MTBE), PAHs plus 1- and 2-methylnaphthalene, and TRPH. Quality assurance and quality control samples will also be collected. The laboratory analytical methods are summarized on Table 3-1.

3.2.2 DPT Groundwater Sampling Plan

Immediately following the soil sampling investigation, TtNUS will collect up to 45 groundwater samples from soil boring locations using a DPT rig. DPT locations will be determined by field screening activities coinciding with the soil sampling. Groundwater samples will be taken immediately below the water table and submitted to a National Environmental Laboratory Accreditation Conference (NELAC) certified on-site mobile laboratory for analysis of BTEX and naphthalene. DPT groundwater samples will be collected using a DPT hole punch groundwater sampling system (or appropriate equivalent). Groundwater sample will be collected using a peristaltic pump until the water is relatively sediment free, with turbidity less than 20 nephelometric turbidity units (NTUs), if possible.

In addition to the mobile laboratory analysis, approximately 10 percent of the samples will be sent to an off-site laboratory for confirmation analysis. The confirmation analysis will include VOCs, MTBE, PAHs plus 1- and 2-methylnaphthalene, TRPH, and total lead. The laboratory analytical methods are summarized on Table 3-2.

TABLE 3-1

SUMMARY OF SOIL ANALYTICAL REQUIREMENTS
UST SITE 22
NAS PENSACOLA
PENSACOLA, FLORIDA

Analysis	Analytical Method	Sample Volume(1)	Bottle ware	Preservation	Holding Time(2)
CLP TCL VOCs	SW-846 8260B	3 x 40 mL	5035 Field Kit	Cool to 4°C,	14 days from sampling to analysis
PAH	SW-846 8270A	1x8 oz	Clear Glass	Cool to 4°C	40 Days
TRPH	FL-PRO	1x8 oz	Clear Glass	Cool to 4°C	40 Days

NOTES:
1 Sample volume may vary based on laboratory requirements.
2 Holding times are measured from the date/time of sample collection.

mL = milliliter
°C = Degrees Celsius
CLP = Contract Laboratory Program
TCL = Target Compound List
VOC = Volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
FL-PRO = Florida Petroleum Range Organics

TABLE 3-2
SUMMARY OF GROUNDWATER SAMPLING ANALYTICAL REQUIREMENTS
UST SITE 22
NAS PENSACOLA
PENSACOLA, FLORIDA

Analysis	Analytical Method	Sample Volume(1)	Bottle ware	Preservation	Holding Time(2)
CLP TCL VOCs	SW-846 8260B	3 x 40 mL	Glass, plastic screw cap, Teflon™-lined	Cool to 4°C, HCl to pH<2	14 days from sampling to analysis
Total Lead	SW-846 6010B	1 Liter	Polyethylene, plastic cap, plastic liner	Cool to 4°C; dark HNO_3 to pH<2	Within 28 days
PAH	SW-846 8270A	2x1 Liter	Amber glass	Cool to 4°C	14 Days
TRPH	FLPRO	2x1 Liter	Amber Glass	Cool to 4°C	7 Days

NOTES:
1 Sample volume may vary based on laboratory requirements.
2 Holding times are measured from the date/time of sample collection.

mL = milliliter
°C = Degrees Celsius
CLP = Contract Laboratory Program
TCL = Target Compound List
VOC = Volatile Organic Compound
TAL = Target Analyte List
HCl = Hydrochloric Acid
PAH = Polynuclear Aromatic Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
HNO_3 = Nitric acid

3.2.3 Micro Well Abandonment and Monitoring Well Installation Plan

Because of hurricane reconstruction activities, five previously installed monitoring wells (MW-45, MW-55, MW-57, MW-56, MW-54, and MW-31) could not be located. TtNUS personnel will attempt to locate and evaluate the missing wells. Based on the evaluation, if required TtNUS will abandon any monitoring wells that are suspected to have been compromised. In conjunction with the abandonment of the wells, TtNUS will install additional permanent micro-type monitoring wells. Up to 17 shallow water table micro wells will be installed at Site 22. The location of these wells will be determined in the field, based in part on the DPT groundwater sampling results; however, the general proposed installation area is shown on Figure 3-2. All monitoring wells will be installed and constructed in accordance with NAVFAC SE and FDEP guidance documents.

3.2.4 Groundwater Sampling

Prior groundwater sampling, water levels and total well depths will be measured at all on-site wells for groundwater piezometric determination. The wells will then be purged, using a peristaltic pump and a low-flow quiescent purging technique. Purging completion will be determined in accordance with FDEP SOP FS 2212, Well Purging Techniques (FDEP, 2004).

Groundwater samples will be collected from the 17 newly installed micro wells and 16 existing monitoring wells. The monitoring and micro wells will be sampled for TCL VOCs, PAHs, TRPH, and total lead. Samples will be selected for off-site confirmation analysis based on the results of the on-site mobile laboratory analysis. Groundwater samples will be collected in accordance with FDEP SOP FS 2220, Groundwater Sampling Techniques (FDEP, 2004).

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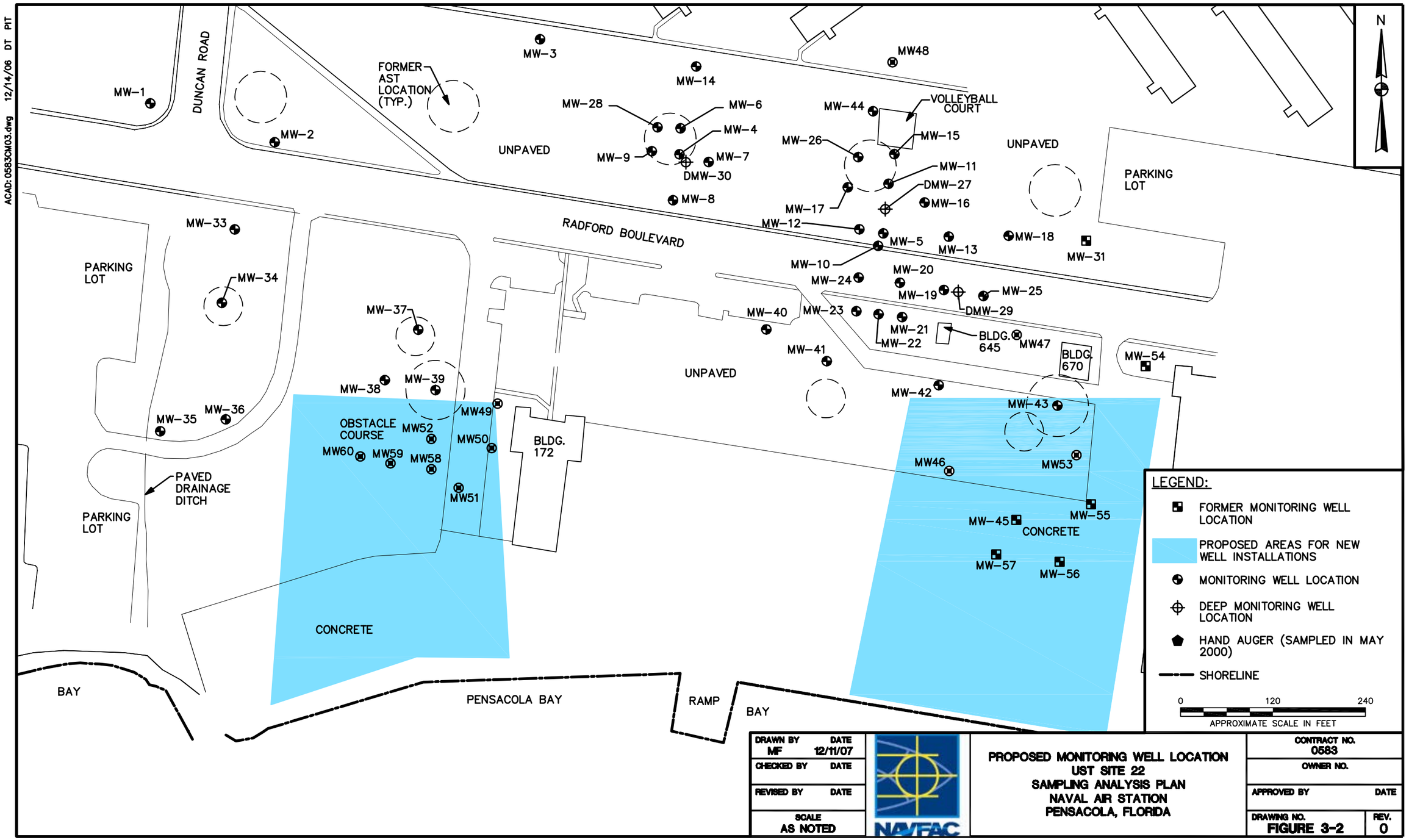

DRAWN BY MF	DATE 12/11/07	PROPOSED MONITORING WELL LOCATION UST SITE 22 SAMPLING ANALYSIS PLAN NAVAL AIR STATION PENSACOLA, FLORIDA	CONTRACT NO. 0583
CHECKED BY	DATE		OWNER NO.
REVISED BY	DATE		APPROVED BY / DATE
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4.0 FIELD OPERATIONS

This section describes the procedures for conducting the project-specific field investigation activities to be performed during the Site 22 Sampling Event. Field operation activities to be performed include mobilization of equipment, waste handling, soil sampling, groundwater sampling, and water level measurements. The individual activities are described below.

4.1 DECONTAMINATION

Decontamination of major equipment and sampling equipment will be in general accordance with FDEP SOP FC 1000, Cleaning / Decontamination Procedures (FDEP, 2004).

4.2 WASTE HANDLING

Limited solid wastes in the form of soil or sediment are expected to be generated during this field program. All solid and liquid wastes generated will be collected in 55-gallon drums and will be handled in accordance with applicable state and federal regulations and the NAS Pensacola IDW Waste Management Plan (Ensafe/Allen & Hoshall, 1994).

4.3 SOIL SAMPLING

Soil samples will be collected using a stainless steel hand auger, and a DPT core barrel. Each sample will be screened with a FID, VOCs are collected then homogenized in a stainless steel bowl and transferred to sample bottles. The samples will be labeled, preserved on ice, and transported to the laboratory. All portions of the sampling equipment used in sample collection will be decontaminated before each use using standard decontamination procedures. Equipment rinsate blanks will be collected from the decontaminated sampler at the prescribed frequency. All soil will be collected using the procedures as specified in FDEP SOP FS 3100, Surface Soil Sampling and FS 3200, Subsurface Soil Sampling (FDEP, 2004).

4.4 DPT GROUNDWATER SAMPLING

DPT groundwater samples will be collected using a DPT hole punch groundwater sampling system (or appropriate equivalent) in conjunction with a peristaltic pump, sterile Teflon, and medical grade surgical tubing. In general, the DPT groundwater sampling system consists of 2.125 outside diameter (OD) steel drive rods, which are hammer driven via DPT to the desired sample depth. When the desired sampling depth is reached a mill-slotted (.02-inch) well point, 1.5 feet in length, is attached to an appropriate length of Teflon tubing and lowered through the inner core of the DPT drive rod to the bottom of the bore hole.

To minimize sediment loading, the screened interval for each sample will be placed approximately 1 foot from the bottom of each DPT borehole. Groundwater samples will be collected using a peristaltic pump until the water is relatively sediment free, with turbidity less than 20 NTUs, when possible. New tubing will be used between each discrete sampling location and depth.

4.5 MICRO WELL INSTALLATION

The temporary wells will be installed using a DPT rig and suitable tools. The initial 4 feet of each temporary well boring will be advanced with a hand auger of suitable diameter in order to clear underground utilities. Each temporary well boring will be advanced to total depth using DPT casing. Total depth of each temporary well boring will be based on the depth to groundwater at the temporary well location. Temporary wells will be installed to bracket the water table, which is anticipated to occur at approximately 6 to 8 feet bls.

The temporary wells will be constructed of new, plastic-wrapped well materials. Each well will be constructed with 1 ¼ inch inside diameter (ID) schedule 40 polyvinyl chloride (PVC) well screen and riser. The well screens will be 10 feet in length with factory machined 0.010 inch slots. Each well screen will be pre-packed with 20/30-grade silica sand. Alternatively, a 20/30-grade silica sand filter pack may be installed inside the DPT casing while the DPT casing is withdrawn, if pre-packed screens are not practical. Excess riser will be cut down to a level in which a fush mount 8-inch man hole cover may be install to protect the well head. A surface seal of sodium bentonite pellets or a fine sand will be placed above the well screen to prevent surface water from entering the well screen and boring will be grouted to land surface.

Each new micro well will be developed with a peristaltic pump and new disposable tubing. Well development will continue until clear water with turbidity less than 20 NTUs, if possible, is obtained and the field parameter including pH, conductivity, and temperature have stabilized.

4.6 GROUNDWATER SAMPLING

Groundwater samples will be collected using low-flow purging (typically a rate of less than 1 liter per minute) and sampling with a peristaltic pump (shallow wells) and Teflon™ tubing dedicated to each well. All groundwater samples will be collected using the procedures specified in FDEP SOP FS 2200, Groundwater Sampling (FDEP, 2004). If light non-aqueous phase liquid is detected in any monitoring well prior to sampling, a groundwater sample will not be collected at that location.

Prior to groundwater sample collection, the monitoring wells will be purged to remove stagnant water in the well casing. Both purging and sampling operations will be conducted at a flow rate that results in a

groundwater turbidity measurement of 20 NTU or less if possible in accordance with FDEP SOP FS 2200, Groundwater Sampling (FDEP, 2004) and the field parameter including pH, conductivity, and temperature have stabilized.

For non-VOC laboratory analysis, groundwater samples are collected using a peristaltic pump sterile Teflon and medical grade tubing The sample aliquot for VOC analysis will be collected last by slowly pulling the Teflon™ tubing out of the well to minimize agitation of the water in the monitoring well and then transferring the contents of the tubing to a VOC vial. After collection, all samples will be placed in a cooler, chilled with ice, and shipped under chain-of-custody protocol to the off-site laboratory for analysis.

4.7 WATER LEVEL MEASUREMENTS

One round of water-level measurements will be conducted at the site during the field event to provide information regarding groundwater flow patterns and gradients including the current tide stage. Water levels will be measured from all existing and available monitoring wells at the site. Water-level measurements will be completed within the shortest time possible on the same day, and no sooner than 24 hours after a significant precipitation event to minimize the precipitation effects on the data sets.

In each monitoring well, water-level and depth measurement will be made by obtaining a direct reading from a measuring tape with an attached water interface probe. Measurement will be recorded to the nearest 0.01 foot and referenced to the top-of-casing notch or north side of the well casing. The measurement tape will be properly decontaminated prior to conducting the measurement event and between each monitoring well.

4.8 SAMPLE HANDLING

4.8.1 Sample Containers, Preservation, Holding Times, and Analyses

The sample containers, preservatives, holding times, and specific analysis are provided in Tables 3-1 and 3-2. Pre-preserved, certified-clean bottle ware will be supplied by the subcontracted laboratory.

4.8.2 Sample Documentation, Packaging, and Shipping

Matrix-specific sample log sheets will be maintained for each sample collected. In addition, sample collection information will be recorded in bound field notebooks or specific field forms. Samples will be packaged and shipped according to FDEP SOP FS 1000, General Sampling Procedures (FDEP, 2004).

4.9 DATA QUALITY REQUIREMENTS

4.9.1 Laboratory Analyses and Quality Assurance/Quality Control Samples

The analytical methods to be used are presented in Tables 3-1 and 3-2. The analytical data packages will be Naval Energy and Environmental Support Activity (NEESA) Level E [United States Environmental Protection Agency (USEPA) Level III]. The analytical data will receive a limited cursory validation.

Rinsate blanks are collected to determine whether the source water or the decontamination process have introduced contaminants to the environmental samples collected. Trip blanks are used to determine if contaminants are introduced in the samples during the sample shipping process. Field duplicates are a single sample split into two portions for a determination of the precision of the sampling and analysis method employed.

The field sampling team will provide the appropriate additional sample volume as prescribed by the laboratory requirements for laboratory duplicate and matrix spike samples. The additional sample aliquots required for analysis of matrix spike/matrix spike duplicates (MS/MSD) will be collected with a frequency of 1 per 20 samples per matrix. See Table 4-1 for frequency of field quality control samples.

4.9.2 Data Reduction, Validation, and Reporting

Formal limited cursory data validation is will be conducted for the laboratory analytical data. The data will be compared to the chain of custody forms and later evaluated to eliminate false positives and false negatives.

TABLE 4-1

FREQUENCY OF FIELD QUALITY CONTROL SAMPLES
UST SITE 22
NAS PENSACOLA
PENSACOLA, FLORIDA

Type Of Samples	Frequency
Rinsate Blank	1 per media per sample event
Trip Blank (VOCs only)	1 per sample shipment
Field Duplicate	1 per 20 samples/matrix
Matrix spike/Matrix spike duplicate (MS/MSD)	1 per 20 samples/matrix

5.0 INVESTIGATION-DERIVED WASTE MANAGEMENT

IDW generated during the supplemental site assessment activities will be managed in accordance with the procedures described in the NAS Pensacola IDW Plan (Ensafe/Allen & Hoshall, 1994). This document emphasizes management of all IDW in an environmentally responsible manner consistent with the Comprehensive, Environmental Response, Compensation, and Liability Act (CERCL)A program, Resource Conservation and Recovery Act (RCRA) requirements, and the base's standard procedures. The objectives of the IDW management plan are

- Management of IDW in a manner that prevents contamination of uncontaminated areas (by IDW) and that is protective of human health and the environment.
- Minimization of IDW, thereby reducing costs and the potential for human or ecological exposure to contaminated materials.
- Compliance with federal and state requirements that are Applicable or Relevant and Appropriate Requirements (ARARs).

6.0 SUPPLEMENTAL SITE ASSESSMENT REPORT

TtNUS will incorporate field data and analytical results into a SSAR. This SSAR will contain appropriate sections concerning site description and background, investigation activities and methodology, site geology and hydrogeology including aquifer characteristics, physical characteristics, nature and extent of contamination, and conclusions and recommendations with necessary figures and tables to explain data.

After internal review, the Draft SSAR will be issued to the Navy for review. Upon incorporation of review comments the Final Site Assessment Report will be issued for regulatory review.

7.0 PROJECT SCHEDULE

The project schedule will be negotiated between the Navy and regulatory agencies.

REFERENCES

E & E (Ecology and Environmental), 1991 Phase I Installation Restoration Site Assessment for Site 21 Naval Air Station Pensacola, Pensacola Florida

Ensafe/Allen & Hoshal, 1994, Comprehensive Long-Term Environmental Action Draft Investigation-Derived Waste Plan, Naval Air Station Pensacola, Pensacola, Florida. April 1994

FDEP (Florida Department of Environmental Protection), 1998. Petroleum Contamination Site Cleanup Criteria, Chapter 62-770 Florida Administrative Code, September 23, 1998.

FDEP, 2004. Standard Operating Procedures for Field Activities DEP-SOP-001/01, February 1, 2004

FDEP, 2005. Development of Cleanup Target Levels (CTLs), Chapter 62-777, Florida Administrative Code, February 2005.

Navy Public Works Center. Contamination Assessment Report (Site 21) Naval Air Station Pensacola, Pensacola, Florida, June 1997

TtNUS (Tetra Tech NUS, Inc.), 2001. Corporate Quality Assurance Program Manual, January 1, 2001.

TtNUS, 2002. Florida Regional Quality Assurance Manual, October 9, 2002.

TtNUS, 2004. Corporate Standard Operating Procedures, April 2004.

University of Florida, 2004. Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C. Center for Environmental & Human Toxicology, Gainesville, Florida, February 26, 2004

USEPA (U.S. Environmental Protection Agency), 1994. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, Office of Solid Waste and Remedial Response, Washington, District of Columbia.

USEPA, 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, Office of Emergency and Remedial Response, Washington, District of Columbia.

APPENDIX A
FIELD FORMS

Tetra Tech NUS, Inc.

DAILY ACTIVITIES RECORD

PROJECT NAME: _____ **PROJECT NUMBER:** _____

CLIENT: _____ **LOCATION:** _____

DATE: _____ **ARRIVAL TIME:** _____

Tt NUS PERSONNEL: _____ **DEPARTURE TIME:** _____

CONTRACTOR: _____ **DRILLER:** _____

ITEM	QUANTITY ESTIMATE	QUANTITY TODAY	PREVIOUS TOTAL QUANTITY	CUMULATIVE QUANTITY TO DATE

COMMENTS: _____

_____

_____

_____

APPROVED BY:

_____ _____

Tt NUS REPRESENTATIVE DRILLER

DATE: _____

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : ______________________

SITE NAME: ______________________

PROJECT No.: ______________________

INSTRUMENT NAME/MODEL: ______________________

MANUFACTURER: ______________________

SERIAL NUMBER: ______________________

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: _____ BORING No.: _____
PROJECT NUMBER: _____ DATE: _____
DRILLING COMPANY: _____ GEOLOGIST: _____
DRILLING RIG: _____ DRILLER: _____

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	PID/FID Reading (ppm): Sampler BZ	PID/FID Reading (ppm): Borehole**	PID/FID Reading (ppm): Driller BZ**

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): _____

Remarks: _____

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: _____
Project No.: _____

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: / Time: / Method: / Monitor Reading (ppm):	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

COMPOSITE SAMPLE DATA:

Date: / Method: / Monitor Readings (Range in ppm):	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Site: _____ Depth to Bottom (ft.): _____ Project Name: _____
Well: _____ Static Water Level Before (ft.): _____ Project Number: _____
Date Installed: _____ Static Water Level After (ft.): _____ Site Geologist: _____
Date Developed: _____ Screen Length (ft.): _____ Drilling Co.: _____
Dev. Method: _____ Specific Capacity: _____
Pump Type: _____ Casing ID (in.): _____

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: _____ WELL ID.: _____

PROJECT NUMBER: _____ DATE: _____

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments

SIGNATURE(S): _____ PAGE___OF___

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: _____ **Project No.:** _____

Location: _____ **Personnel:** _____

Weather Conditions: _____ **Measuring Device:** _____

Tidally Influenced: **Yes** ____ **No** ____ **Remarks:** _____

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: _____
Project No.: _____

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: / Time:	**Color** (Visual)	**pH** (S.U.)	**S.C.** (mS/cm)	**Temp.** (^{0}C)	**Turbidity** (NTU)	**DO** (mg/l)	**Salinity** (%)	Other
Method:								

PURGE DATA:

Date:	**Volume**	**pH**	**S.C.**	**Temp.**	**Turbidity**	**DO**	**Salinity**	Other
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	**Preservative**	**Container Requirements**	**Collected**

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD **Duplicate ID No.:**

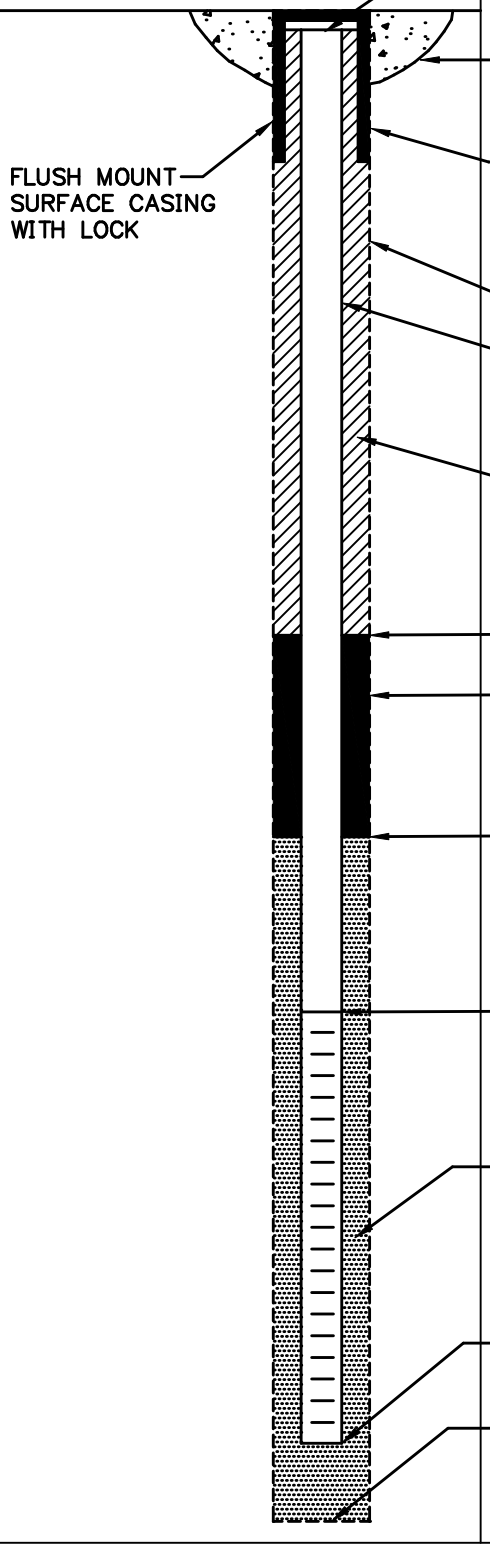
Signature(s):

WELL NO.: _____

Tetra Tech NUS, Inc.

OVERBURDEN
MONITORING WELL SHEET
FLUSH - MOUNT

PROJECT _____	LOCATION _____	DRILLER _____
PROJECT NO. _____	BORING _____	DRILLING METHOD _____
DATE BEGUN _____	DATE COMPLETED _____	
FIELD GEOLOGIST _____		DEVELOPMENT METHOD _____
GROUND ELEVATION _____	DATUM _____	



ELEVATION TOP OF RISER: _____

TYPE OF SURFACE SEAL: _____

_____

TYPE OF PROTECTIVE CASING: _____

_____

I.D. OF PROTECTIVE CASING: _____

DIAMETER OF HOLE: _____

TYPE OF RISER PIPE: _____

_____

RISER PIPE I.D.: _____

TYPE OF BACKFILL/SEAL: _____

_____

ELEVATION/DEPTH TOP OF SEAL: _____ / _____

TYPE OF SEAL: _____

_____

ELEVATION/DEPTH TOP OF SAND: _____ / _____

ELEVATION/DEPTH TOP OF SCREEN: _____ / _____

TYPE OF SCREEN: _____

SLOT SIZE x LENGTH: _____

TYPE OF SAND PACK: _____

_____

DIAMETER OF HOLE IN BEDROCK: _____

ELEVATION / DEPTH BOTTOM OF SCREEN: _____ / _____

ELEVATION / DEPTH BOTTOM OF SAND: _____ / _____

ELEVATION/DEPTH BOTTOM OF HOLE: _____ / _____

BACKFILL MATERIAL BELOW SAND: _____

_____

ACAD: FORM_MWFM.dwg 07/20/99 INL

APPENDIX B

HEALTH AND SAFETY PLAN
UST SITE 22

Comprehensive **L**ong-term **E**nvironmental **A**ction **N**avy

CONTRACT NUMBER N62467-04-D-0055

Health and Safety Plan
for
Supplemental Assessment Activities
at
Site 21 Sludge Disposal
Fuel Tank Site

Naval Air Station Pensacola
Pensacola, Florida

Contract Task Order 0056

December 2006

NAVFAC Naval Facilities Engineering Command
Southeast
2155 Eagle Drive
North Charleston, South Carolina 29406

TETRA TECH NUS, Inc.

HEALTH AND SAFETY PLAN
FOR THE
SITE ASSESSMENT REPORT
AT
UNDERGROUND STORAGE TANK (UST) SITE 22
(FORMER INSTALLATION RESTORATION SITE 21)

NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION-NAVY (CLEAN) CONTRACT

Submitted to:
Southeast
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-04-D-0055

CONTRACT TASK ORDER 0056

DECEMBER 2006

PREPARED UNDER THE SUPERVISION OF:

Gerald A Walker

GERALD WALKER, P.G.
TASK ORDER MANAGER
TETRA TECH NUS
TALLAHASSEE, FLORIDA

APPROVED FOR SUBMITTAL BY:

Matthew M Soltis

MATTHEW M. SOLTIS, CIH, CSP
CLEAN HEALTH AND SAFETY MANAGER
TETRA TECH NUS
PITTSBURGH, PENNSYLVANIA

TABLE OF CONTENTS

ATTACHMENTS

TABLES

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FIGURES

NUMBER **PAGE**

1.0 INTRODUCTION

The objective of this Health and Safety Plan (HASP) is to provide the minimum safety practices and procedures to Tech NUS (TtNUS) personnel conducting soil and groundwater sampling and installation of micro wells at Underground Storage Tank Site 22 (UST 22); Former Installation Restoration Site 21 (IR Site 21) - Former AVGAS Tank Farm located at Naval Air Station Pensacola, in Pensacola, Florida.

Authorization: This Health and Safety Plan (HASP) and the work described herein have been completed under the authorization of:

Contract: Comprehensive Long Term Environmental Action – Navy (CLEAN) – Southeast Naval Facilities Engineering Command
Contract Number: N62467-04-D-0055
Contract Task Order Number (CTO): 0056
Statement of Work/Application: SOW #1334. This HASP will support the following activities

- Mobilization/Demobilization
- Subsurface and groundwater sampling using Direct Push Technology (DPT)
- Micro well installation using DPT and groundwater sampling
- Decontamination activities
- IDW Management

Proposed Dates of Work: Winter 2006/2007 until completion (See work plan for detailed schedule).

Compliance: The elements of this HASP are intended to be in compliance with the requirements established by:

- OSHA 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response" (HAZWOPER)
- Applicable sections of 29 CFR 1926 "Safety and Health Regulations for Construction."
- Tetra Tech NUS Health and Safety Program
- NAS Pensacola Policies and Procedures, where and as applicable.

This HASP must be accompanied by the Tetra Tech NUS, Inc. Health and Safety Guidance Manual (TtNUS HSGM). The Guidance Manual provides additional information in the areas of program support, standard operating procedures, and safe work practices.

Modifications/Changes: This HASP has been prepared using the latest available information regarding known or suspected chemical contaminants and potential and foreseeable physical hazards associated with the planned work at NAS Pensacola. The following conditions are considered sufficient basis review and possible changes to this document

- The addition or modification of activities/tasks outside of those specified in Section 4.0, Scope of Work.

- New information becomes available through the course of the investigation or from outside sources.

All changes to this HASP will be requested through the Task Order Manager (TOM) to the Tetra Tech NUS Health and Safety Manager (HSM). It is the responsibility of the TOM to notify all affected personnel of all changes to this HASP.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibilities for site safety and health for TtNUS and subcontractor employees conducting environmental sampling and other field activities. Personnel assigned to these positions shall exercise the primary responsibility for on site health and safety. These persons will be the primary point of contact for any questions regarding the safety and health procedures and the selected control measures.

- The TtNUS TOM is responsible for the overall direction of health and safety for this project.

- The PHSO is responsible for the development of this HASP in accordance with applicable OSHA regulations as specified in Section 1.0 and to serve as technical support regarding all matters of health and safety as it may pertain to the tasks to be completed and this scope of work.

- The TtNUS Field Operations Leader (FOL) is responsible for implementation of the HASP with the assistance of an appointed SHSO. The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.

- The SHSO supports site activities by advising the FOL on all aspects of health and safety on site as they may pertain to regulatory requirements or task related hazards. These duties may include:

    - Verification of training and medical status of on-site personnel in relation to site activities.
    - Assisting and/or representing TtNUS coordinating emergency services (if needed)

- Providing elements site-specific training for on site personnel.
- Coordinating health and safety activities
- Selecting, applying, inspecting, and maintaining personal protective equipment
- Establishing work zones and control points
- Implementing air monitoring procedures as directed.
- Implementing hazard communication, respiratory protection, and other associated safety and health programs.

- Compliance with the requirements stipulated in this HASP is monitored by the SHSO and coordinated through the PHSO and the TtNUS CLEAN HSM.

Note: In some cases one person may be designated responsibilities for more than one position. For example, at NAS Pensacola the FOL may also be responsible for the SHSO duties. This action will be performed only as credentials, experience, and availability permits.

1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: Naval Air Station Pensacola Address: Pensacola, Florida

Navy Engineer-In-Charge (EIC): Mr. Bill Hill Phone Number: (843) 820-7324

NAS Pensacola Environmental Coordinator: Greg Campbell Phone Number: (850) 452-4611 ext. 103

Purpose of Site Visit: To collect additional soil and groundwater samples via DPT to delineate the vertical and horizontal extent of contamination; install permanent flush mounted confirmation micro wells as required; and collect groundwater samples from 33 new and exiting monitoring wells.

Project Team:

TtNUS Management Personnel:	Discipline/Tasks Assigned:	Phone #'s
Gerald Walker, P.G.	Task Order Manager (TOM)	(850) 385-9899
Matthew M. Soltis, CIH, CSP	CLEAN Health and Safety Manager	(412) 921-8912
TBD	Field Operations Leader (FOL)	TBD
TBD	Site Health and Safety Officer (SHSO)	
Donald J. Westerhoff, CSP	Project Health and Safety Officer (PHSO)	(800) 245-2730

Non-TtNUS Personnel Affiliation/Discipline/Tasks Assigned		Phone #'s
TBD	Direct Push Drilling Subcontractor	

Hazard Assessment (for purposes of 29 CFR 1910.132) for HASP preparation has been conducted by:

Prepared by: Donald J. Westerhoff, CSP

TBD - To be determined

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section of the HASP is part of a preplanning effort to direct and guide field personnel in the event of an emergency. The first measure in accomplishing this objective is to define, what is and is not, an emergency.

An emergency as defined in 1910.120 is:

> *An occurrence or condition that can or has resulted in an uncontrolled release of a hazardous substance or potential safety hazard (i.e., fire, explosion, chemical exposure) associated with that release.*

An incidental release as defined in 1910.120 is:

> *The releases of a hazardous substance that can be absorbed, neutralized, or otherwise controlled and will not result in potential safety hazard (i.e., fire, explosion, chemical exposure) are not considered emergency responses.*

Based on the above definitions, TtNUS will provide through on-site resources and personnel initial incident response measures for incidents such as:

- Initial fire-fighting support and prevention
- Initial spill control and containment measures and prevention
- Removal of personnel from emergency situations
- Provision of initial medical support for injury/illness requiring only first-aid level support
- Provision of site control and security measures as necessary

Incidents and conditions above this level of participation are and will be considered emergencies. These events are considered beyond the capabilities of field personnel and above available resources to provide emergency response safely. The emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders in the event of an emergency. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time.

This Emergency Action Plan conforms to the requirements of 29 CFR 1910.38(a), as allowed in 29 CFR 1910.120(l)(1)(ii).

The FOL and/or the SHSO are responsible for this plans implementation. Any and all questions should be directed to them or the PHSO for clarification.

2.2 EMERGENCY PLANNING – RECOGNITION AND PREVENTION

The primary focus of this section is the ability to recognize and control factors that could contribute to an incident/emergency situation/condition. Situations/conditions recognized that could lead to an incident/emergency situation include

DPT Drilling – Soil sampling and micro well installation – There are common hazards associated with DPT operation. However, of those hazards that could result in an emergency situation include

- Energized systems – A hazard associated with underground investigation is the potential for contacting underground utilities (i.e., electric, gas, water, etc.). The consequences of contacting and damaging these utilities can be significant. As this area was a light industrial area, the potential for underground and overhead utilities to be present in our work areas are anticipated to be significant. See Section 5.8 Drilling Safe Work practices, Table 5-1 Soil Boring/Monitoring Well Installation, Attachment II Utility Locating and Excavation Clearance SOP, and Section 4.0 of the HSGM for detection and control measures associated with this hazard.

- Pressurized systems – This hazard is compounded due to the workers close proximity to pressurized hydraulic lines and systems on the DPT rigs. Those fittings and connections near the operator or drillers helper that are not guarded will be secured by whatever means are necessary (i.e., appropriate and unmodified fittings, pressurized line restraints). See Section 5.8 Drilling Safe Work practices, Table 5-1 Soil Boring/Monitoring Well Installation, and Section 4.0 of the HSGM for control measures to prevent or minimize these hazards.

- Cuts, pricks, and lacerations – This hazard is possible when cutting the acetate liners. To combat this hazard the Geoprobe Sampling Kit or similar equipment is required. This mechanism secures the acetate liner while cutting. A number of incidents have occurred over the past few years resulting in serious injuries. See Table 5-1 Soil Boring/Monitoring Well Installation for control measures associated with this hazard.

Chemical Hazards – Potential occupational chemical exposure during this activity would be anticipated under the following conditions.

- Contaminant exposure based on direct interaction with contaminated media. See Table 6-1 for potential health effect information for known or suspected site contaminants, Table 5-1 Soil boring/Monitoring Well Installation for recommended control measures to prevent or minimize these hazards.

Throughout this document control measures for preventing these situation/conditions are provided.

2.2.1 General Practices – Emergency Planning

To further minimize and eliminate potential emergency situations, emergency planning activities associated with this project, the following responsibilities are assigned to the FOL and/or the SHSO:

- The FOL and/or the SHSO will coordinate response actions with NAS Pensacola Emergency Services personnel to ensure that TtNUS emergency action activities are compatible with facility emergency response procedures. This will serve as the initial review of the Emergency Action Plan.

- Establish and maintain information at the project staging area (Support Zone) for easy access in the event of an emergency. This information includes the following:
  - Chemical Inventory (for substances used on-site), with Material Safety Data Sheets.
  - On-site personnel medical records (medical data sheets).
  - A logbook identifying personnel on-site each day.
  - Emergency notification phone numbers and maps to the hospital will be maintained in site vehicles.

Note: It is the responsibility of the TtNUS FOL and/or the SHSO to ensure that this information is available and present at the site.

- **Identifying a chain of command for emergency action** – The FOL and/or the SHSO will serve as Incident Commander in the event of an on-site incident. He or she will remain in this position unless the incident progresses to an emergency situation. Once emergency response crews arrive, he or she will relinquish command to the responding agency.

- **Educating site workers** - Educating site workers to the potential emergency situations that may exist and the associated control measures will be critical in early recognition and prevention. This will be accomplished through
  - Site specific training
  - Use and application of the Safe Work Permit System (See Section 10.2)

- Daily Tool Box Meetings to discuss safety and health issues as it pertains to a task or those identified through operations evaluations conducted by the FOL and/or the SHSO.
- Previewing work areas to identify, barricade, or remove physical hazards where identified.

- **Survey Work Areas before committing personnel and resources** - Identify, remove, and/or barricade physical hazards within the estimated work area.
  - Ensure that approach paths to monitoring wells are maintained (cleared, mowed, etc.)
  - Inspect monitoring well protective casings are cleared of spider and insect nests.
  - Inspect remote sample locations for signs of natural hazards (i.e., heavy brush – ticks; snakes, etc.)

- **Provide the necessary emergency action equipment** to control potential emergencies (i.e., safety cans for flammable liquid storage, spill containment equipment, PPE, and emergency equipment such as portable fire extinguishers). It will be the responsibility of the SHSO to determine how many first aid kits, fire extinguishers, etc. are required based on the number of remote and/or separated concurrent operations are being conducted.

- **Evaluate/Survey operations** to ensure that necessary measures are taken to control and/or minimize the impact of emergency situations/conditions. This includes actions such as, but not limited to, securing the necessary permits and clearances such as Utility and Excavation Clearances provided by the Base and Sunshine State One Call of Florida, Inc.; Ensuring equipment and resources are at the ready for response to incidental measures; Personnel are adequately trained in the provisions of this HASP and this Emergency Action Plan. The information derived from these periodic evaluations will provide some of the content for the daily tool box meetings. The Daily Tool Box meeting will provide the forum for discussion and resolution to these findings.

Field Crew shall:

- Identify, remove, or barricade physical hazards within the estimated work area identified by the FOL and/or the SHSO.

- Follow the guidelines for control of emergency conditions.

- Report any potential emergency situation to the FOL and/or the SHSO.

2.3 SAFE DISTANCES AND PLACES OF REFUGE/EMERGENCY ALERTING

In the event of an incident, personnel will engage identified resources necessary to prevent the condition/situation from becoming an emergency. In the event these initial response measures cannot control the incident personnel will undertake the following measures:

- Evacuate non-essential personnel to identified safe places of refuge and secure the immediate area.
- The FOL and/or the SHSO will notify emergency services
  - Give the emergency operator the location of the emergency and a brief description of what has occurred.
  - Stay on the phone and follow the instructions given by the operator.
  - The appropriate agency will be notified and dispatched.
- Field personnel will provide perimeter security of the work area until emergency services arrive.
- Once emergency services arrive, TtNUS and subcontractor personnel will report to the designated safe place of refuge.

2.4 DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT

During an evacuation, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. However, it is unlikely that an emergency would occur which would require workers to evacuate the site without first performing decontamination procedures. Decontamination of medical emergencies will proceed in the following manner.

Non-Life Threatening Medical Incident (Bruises, Cuts, Scrapes, Etc.)

The area of clothing or suit penetration will be isolated from the decontamination procedure by removing the protective garments or clothing surrounding the area of the injury and applying a light gauze wrap and plastic cover. Decontamination for unaffected areas will proceed as per Table 5-1 of this HASP.

Life Threatening

- Engage Emergency Notification Sequence
- Notify off-site response agencies.
- If it will not endanger the injured individual (i.e., spinal cord injury, etc.) remove any outer PPE. Removal may require the use of bandage scissors to remove the outer garments.
- Begin life saving techniques as appropriate (CPR, cooling or warming regimens, etc.).
- Cover the injured in a blanket to prevent the onset of shock.
- Follow instructions provided in Attachment I.

Note: One person from the field team will accompany the injured to the hospital with his/her medical data sheet, appropriate MSDSs (if applicable), a copy of this HASP, and the incident forms. This person will collect as much information as possible, and transfer that information to the HSM and WorkCare as per the Incident Response Protocol provided in Figure 2-1. All other personnel will engage site control/site security measures.

The SHSO upon insuring care for the injured party will engage an investigation of the incident to gather as much information as possible. This includes as a minimum answering the questions Who? What? Where? When? Why? and How?. This information will then be communicated to the PM and the HSM. Attachment I Tetra Tech NUS, Inc. Injury/Illness Procedure will be used to accomplish this task.

Emergency Medical Treatment

Tetra Tech NUS and subcontractor personnel are only permitted to provide treatment to the level of their First-Aid Training. It should also be noted all first aid shall be administered voluntarily. In all cases, make sure a member of the field crew notifies the emergency services and that they are enroute.

All First-Aid provided will incorporate the following protective measures:

Emergency medical treatment will be initiated under the following guarded restrictions:

- Take the necessary precautions to prevent direct contact with the injured person's body fluids. This may be accomplished through the employment of the following measures:
  - Use surgeon's gloves when handling cuts, abrasions, bites, punctures, etc. or any part of the injured person. The use of safety glasses and surgeons masks is recommended, if there is the potential for uncontrolled spread of body fluids. The PHSO will be immediately notified in event that personnel providing emergency first-aid and/or come into contact with body fluids or other potentially infectious tissues.
  - Should Cardio-Pulmonary Resuscitation (CPR) be required, use a CPR Micro-Shield mouthpiece when administering CPR to prevent contact with the injured person's body fluids.

In order to engage these protective measures the FOL shall insure that these items are part of their first-aid kit.

2.5 EMERGENCY CONTACTS

Prior to performing work at the site, all personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an incident. A mobile/cellular phone shall be available on site. It will be the

responsibility of the FOL and/or the SHSO to test or otherwise insure that the signal strength is sufficient to contact emergency services. If it is not then a different provider, two way radios, or other supported means of communication will be utilized. Table 2-1 provides a list of emergency contacts and their corresponding telephone numbers. This table must be posted on site where it is readily available to all site personnel or provided to site personnel.

TABLE 2-1
EMERGENCY CONTACTS
NAS PENSACOLA

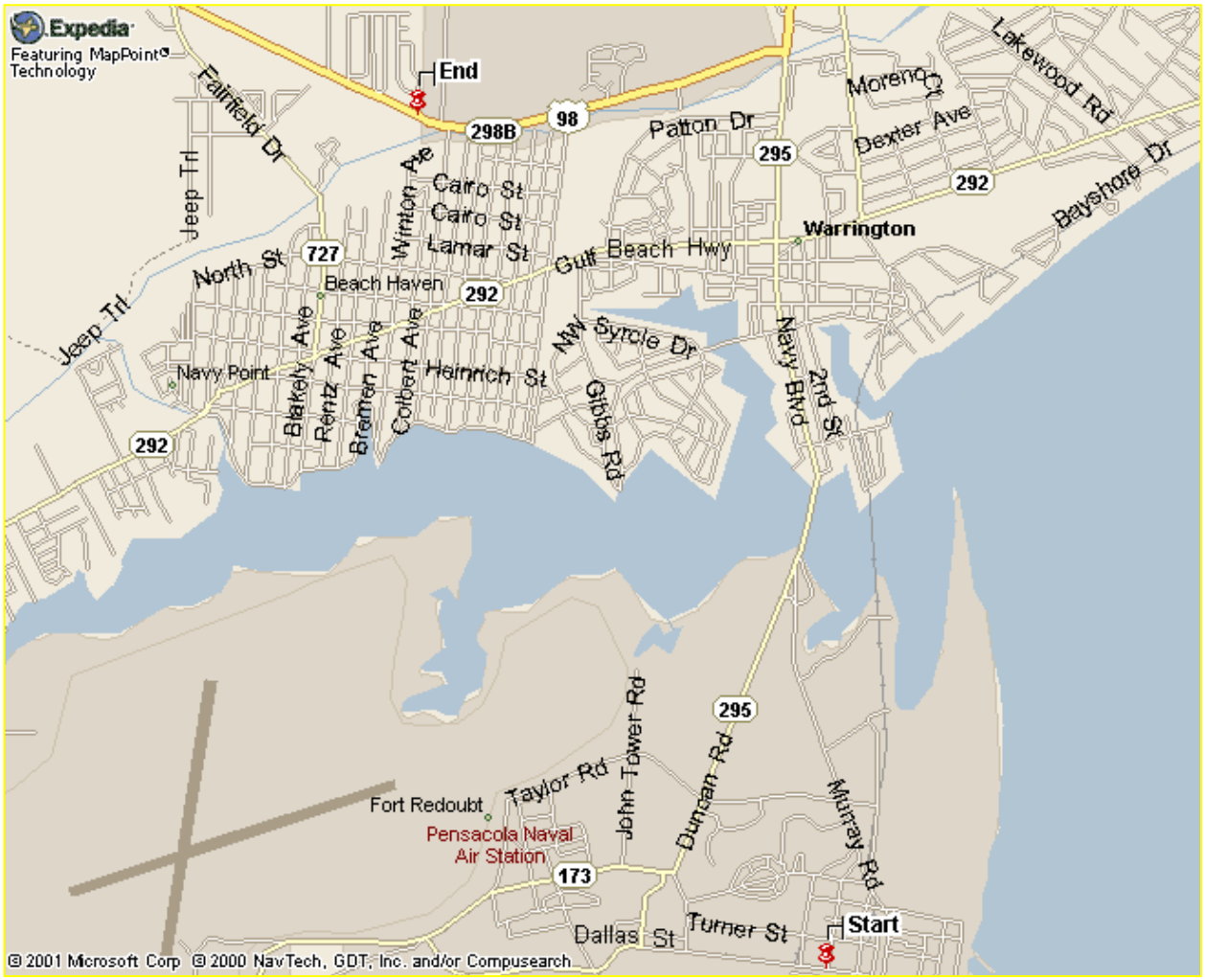
AGENCY	TELEPHONE
EMERGENCY (outside services)(Police, Fire, and Ambulance Services)	**911**
NAS Pensacola – Emergency Dispatch	(850) 452-3333
Navy Engineer-in-Charge - Mr. Bill Hill	(843) 820-7324
Facility Point of Contact -Mr. Greg Campbell	(850) 452-4611 ext 103
Navy Hospital	(850) 505-6600
Baptist Hospital	(850) 469-2313
Poison Control Center	(800) 222-1222
Florida Game and Fresh Water Fish Commission - Northwest Region Office	(850) 265-3676
WorkCare	(800) 229-3674
TtNUS Tallahassee Office - and Task Order Manager (Gerry Walker)	(850) 385-9899
CLEAN Health and Safety Manager - Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health and Safety Officer – Donald J. Westerhoff, CSP	(800) 245-2730

2.6 ROUTE TO HOSPITALS

Two hospitals could potentially be used during this project depending on the circumstances and degree of the emergency. For emergency situations the Naval Hospital Pensacola (NHP) should be utilized. The hospital is closer to the site and is fully prepared to accept trauma cases as well as potentially chemically contaminated patients. Baptist Hospital will be used for all non-emergency care services. Routes and directions to these hospitals are provided in Figures 2-1 and 2-2, respectively.

FIGURE 2-1

Navy Hospital Pensacola
6000 W. Highway 98
Pensacola, Florida 32512
(850) 505-6600



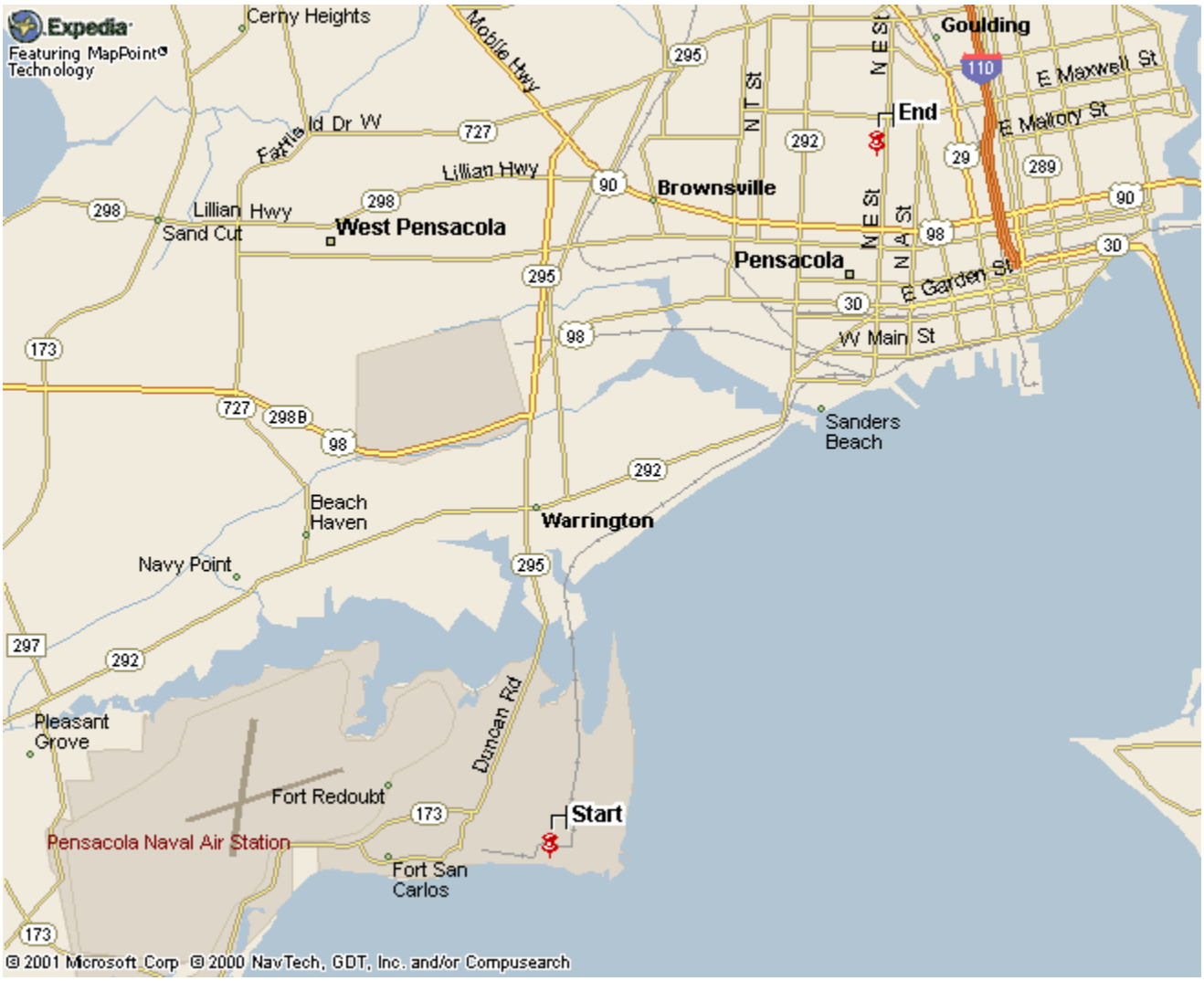
❶ Proceed out of Main Gate (Navy Blvd/Rt. 295) heading north towards US Highway 98.

❷ Turn left (heading west) on US 98 and proceed approximately 1 mile.

❸ Hospital will be on the right (Building 2268).

FIGURE 2-2

Route to Baptist Hospital
1000 West Moreno Blvd.
Pensacola, FL 32508
(850-469-2313)



Directions to this Hospital <u>from the Main Gate of NAS Pensacola</u> are:

❶ Proceed out of Main Gate (Navy Blvd/Rt. 295) heading north to Hwy 292.

❷ Turn right (heading east) on Hwy 292 until it turns into Garden Street (approx. 3 miles).

❸ Take Garden Street to intersection with “E” Street.

❹ Turn left onto “E” Street and proceed approximately 1 mile to Hospital on left.

2.7 INJURY/ILLNESS REPORTING

In addition, TtNUS personnel who are injured or become ill on the job must notify appropriate company representatives. Figure 2-3 and Attachment I provides the procedure for reporting an injury/illness, and the form to use for this purpose.

FIGURE 2-3
POTENTIAL EXPOSURE PROTOCOL

The purpose of this protocol is to provide guidance for the medical management of injury situations.

In the event of a personnel injury or accident:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, and shock.
- Transfer the victim to the medical facility designated in this HASP by suitable and appropriate conveyance (i.e. ambulance for serious events)
- Obtain as much exposure history as possible (a Potential Exposure report is attached).
- If the injured person is a Tetra Tech NUS employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the WorkCare physician. WorkCare will contact the medical facility and request specific testing which may be appropriate. WorkCare physicians will monitor the care of the victim. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call WorkCare at 1-800-455-6155 and enter Extension 109, or follow the voice prompt for after hours and weekend notification and be prepared to provide:
  - Any known information about the nature of the injury.
  - As much of the exposure history as was feasible to determine in the time allowed.
  - Name and phone number of the medical facility to which the victim(s) has/have been taken.
  - Name(s) of the involved Tetra Tech NUS, Inc. employee(s).
  - Name and phone number of an informed site officer who will be responsible for further investigations.
  - Fax appropriate information to WorkCare at (714) 456-2154.
- Contact Corporate Health and Safety Department (Matt Soltis) and Human Resources Manager Marilyn Duffy at 1-800-245-2730.
- As data is gathered and the scenario becomes more clearly defined, this information should be forwarded to WorkCare.

WorkCare will compile the results of the data and provide a summary report of the incident. A copy of this report will be placed in each victim's medical file in addition to being distributed to appropriately designated company officials.

Each involved worker will receive a letter describing the incident but deleting any personal or individual comments. A personalized letter describing the individual findings/results will accompany this generalized summary. A copy of the personal letter will be filed in the continuing medical file maintained by WorkCare.

FIGURE 2-3 (continued)
WORKCARE

POTENTIAL EXPOSURE REPORT

Name: _____ Date of Exposure: _____

Social Security No.: _____ Age: _____ Sex: _____

Client Contact: _____ Phone No.: _____

Company Name: _____

I. Exposing Agent

Name of Product or Chemicals (if known): _____

_____

Characteristics (if the name is not known)

Solid Liquid Gas Fume Mist Vapor

II. Dose Determinants

What was individual doing? _____

How long did individual work in area before signs/symptoms developed? _____

Was protective gear being used? If yes, what was the PPE? _____

Was their skin contact? _____

Was the exposing agent inhaled? _____

Were other persons exposed? If yes, did they experience symptoms? _____

III. Signs and Symptoms (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Nausea / Vomiting
Dizziness
Weakness

Delayed Symptoms:

Weakness
Nausea / Vomiting
Shortness of Breath
Cough
Loss of Appetite
Abdominal Pain
Headache
Numbness / Tingling

IV. Present Status of Symptoms (check off appropriate symptoms)

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Cyanosis
Nausea / Vomiting
Dizziness
Weakness
Loss of Appetite
Abdominal Pain
Numbness / Tingling

Have symptoms: (please check off appropriate response and give duration of symptoms)

Improved: _____ Worsened: _____ Remained Unchanged: _____

V. Treatment of Symptoms (check off appropriate response)

None: _____ Self-Medicated: _____ Physician Treated: _____

3.0 SITE BACKGROUND

3.1 SITE DESCRIPTION

NAS Pensacola is located in Escambia County in the panhandle of Northwest Florida. The installation occupies 8,423 acres of land - 5,800 acres at the main installation (NAS), and 2,623 acres at other area locations including Corry Station, Saufley Field and Outlying Landing Field Bronson.

3.2 SITE 22

Site 22 is the former location of an aviation gasoline (AVGAS) tank farm. From approximately 1940 to the late 1960's, nine above ground storage tanks (ASTs) were used to store aviation gasoline at the site. The tanks were routinely cleaned and the sludge from the bottoms of the tanks was disposed of on the ground surface in the immediate vicinity of the tanks. The ASTs have been removed from the site and the majority of the site is currently grass covered.

Building 670, which is a fuel system pump house, is located at the eastern edge of the site, south of Radford Boulevard. Two USTs for contaminated fuel were reportedly associated with Building 670.

Previous investigations at the site include the Phase I Installation Restoration (IR) assessment conducted in 1991 and the Contamination Assessment Report (CAR) field investigations conducted in December 1995 and January 1997. In June 1997, the NAS Pensacola Navy Public Works Center submitted the CAR based on the findings of these investigations.

Upon review of the CAR prepared by the Navy, the Florida Department of Environmental Protection (FDEP) issued a technical review letter on August 25, 1997, which requested additional site assessment in order to meet the requirements of Chapter 62-770, Florida Administrative Code (FAC). The SAR addendum investigation was conducted from May to July 2000. Areas of the site were identified where petroleum constituent concentrations in site soil or groundwater exceeded regulatory criteria. Based on the additional site assessment data, the SAR addendum report recommended additional soil delineation and groundwater monitoring at the site. On April 20, 2001, FDEP issued a technical review letter agreeing with the recommendations in the SAR and requesting that additional assessment be conducted at the site before preparation of the Remedial Action Plan (RAP).

4.0 SCOPE OF WORK

This section discusses the specific tasks that are to be conducted as part of this scope of work as identified by CTO 0056. These tasks are the only ones addressed by this HASP. Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this document. The TOM or a designated representative will submit the requested modifications to this document to the HSM.

Specific tasks to be conducted include the following:

- Mobilization/demobilization activities
- Soil borings and groundwater sampling via DPT
  - 1st Event – DPT borings will be advanced at up to 45 locations and include collection of up to 40 soil samples and 45 groundwater samples. The borings will each be advanced to a depth of up to 10 feet. A mobile lab will be present on site and will perform analysis of the samples for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and naphthalene. Up to 10 of the samples will be sent off-site for confirmatory laboratory analysis.
  - 2nd Event – Up to 17 shallow water table micro wells will be installed using DPT. The wells will be installed to a depth of up to 20 feet at locations determined based on the results of Event 1 sampling.
  - Groundwater samples will be collected from the 17 newly installed micro wells and 16 existing monitoring wells. Twelve of the wells will be sampled for lead only and 21 of the wells will be sampled for BTEX, polynuclear aromatic hydrocarbons (PAHs), total recoverable petroleum hydrocarbons, and lead.
- Decontamination
- IDW Management – 55-gallon drums will be used to containerize residual soil as well as purge/development/decontamination water.

For more detailed description of the associated tasks, refer to the Work Plan (WP).

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES

Table 5-1 of this section is intended to assist project personnel in the recognition of hazards and recommended control measures necessary for each planned task to minimize potential exposure or injuries related to those hazards. The table also assists field team members in determining which personal protective equipment (PPE) and decontamination procedures are to be used as well as appropriate air monitoring techniques and action levels. This table must be updated if the scope of work, contaminants of concern, or pertinent conditions change.

Safe Work Permits will be issued for all site activities (See Section 10.2). The FOL and/or the SHSO will use the elements defined in Table 5-1 as the primary reference for completing the Safe Work Permit adding additional information as warranted.

The following text provides a general description of the tasks to be conducted and is the basis for the hazard assessment.

5.1 GENERAL SAFE WORK PRACTICES

In addition to the task-specific safe work practices identified in Table 5-1 to be employed to minimize task specific hazards, the following general safe work practices will be observed. These safe work practices establish a pattern of general precautions and measures for reducing risks associated with hazardous site operations.

- Refrain from eating, drinking, chewing gum or tobacco, taking medication, or smoking in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists.

- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. This is especially critical between breaks and prior to lunch and associated hand to mouth activities.

- Avoid contact with potentially contaminated substances by walking around puddles, pools, mud, or other such areas. Avoid, whenever possible, kneeling on the ground or leaning or sitting on equipment. Do not place monitoring equipment on potentially contaminated surfaces. Containerize cuttings/ waters as they are generated.

- Be familiar with and adhere to all instructions provided within this site-specific HASP.

- Be aware of the location of the nearest telephone and all emergency telephone numbers. See Section 2.0, Table 2-1.

- Attend Daily Tool Box Meetings on anticipated hazards, equipment requirements, Safe Work Permits, emergency procedures, and communication methods before going on site.

- Plan and mark entrance, exit, and emergency escape routes. See Section 2.0.

- Rehearse unfamiliar operations prior to implementation.

- Use the “buddy system”.

- Maintain visual contact with each other and with other on-site team members by remaining in close proximity in order to assist each other in case of emergency.

- Establish appropriate Safety Zones including Support, Contamination Reduction, and Exclusion Zones.

- Minimize the number of personnel and equipment in contaminated areas (such as the Exclusion Zone). Non-essential vehicles and equipment should remain within the Support Zone.

- Establish appropriate decontamination procedures for leaving the site.

- Immediately report all injuries, illnesses, and unsafe conditions, practices, equipment/property damage, and near miss incidents to the Site Health and Safety Officer (SHSO), PHSO, and HSM.

- Matches and lighters are restricted from entering in the Exclusion Zone or Contamination Reduction Zone. Smoking will only be permitted in specified areas at near Site 22.

- Observe coworkers for signs of toxic exposure and heat or cold stress.

- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

5.2 DRILLING (DPT) SAFE WORK PRACTICES

The following Safe Work Practices are to be followed when working in or around the DPT Drill Rig Operations.

Before Drilling

- Identify all underground utilities and buried structures before drilling. This service is provided by the NAS Pensacola and Sunshine State One Call of Florida. In addition, Tetra Tech NUS, Inc. personnel will use the Utility Locating and Excavation Clearance Standard Operating Procedure provided in Attachment II.

  - Tetra Tech NUS, Inc. personnel will mark the locations of the subsurface soils samples and micro well locations. NAS Pensacola will complete the utility clearance through internal mechanisms such as public works or through using Sunshine State One Call of Florida (1-800-432-4770) for clearance of the location(s). Often times intersections, building numbers, or other location identifiers are provided. It is best to provide as much assistance as possible through providing these identifiers and scaled drawings. Ensure that marks are on the ground using white paint or flagging. Tetra Tech NUS, Inc. personnel will still be required to complete the Tetra Tech NUS, Inc. Utility Locating and Excavation Clearance Standard Operating Procedure provided in Attachment II.

  - When services such as Sunshine State One Call of Florida are employed typical timeline for marking and providing clearances is 48-hrs. A ticket or ticket number will be provided referring to your clearance. This will have a timeline, generally 14-days. Again problems sometime arise here because site personnel allow their tickets to expire, then accidentally encounter a utility. Tickets must be maintained valid by asking for a re-issue or extension, when necessary, prior to expiration. When NAS Pensacola provides the clearances the Excavation Permit issued will also have an expiration date. If the work will not be completed by the expiration date an extension must be requested prior to the expiration date.

  - Another problem that occurs with utility clearances is that utility locations marked on the ground may not remain visible. The FOL is responsible for ensuring that utility locations/marks on the ground are maintained so they remain visible (repaint, pin flags, etc.), and to annotate maps with these locations so they may be incorporated into the GIS system.

  - Lastly, once marks are placed on the ground and have been cleared, only limited leeway (2-feet) exists to stray from the planned and approved intrusive locations.

- A minimum clearance of 20-feet will be maintained from overhead power lines.

- All DPT drill rigs will be inspected by the SHSO or designee, prior to the acceptance of the equipment at the site and prior to the use of the equipment. All repairs or deficiencies identified will be corrected prior to use. The inspection will be accomplished using the Equipment Inspection Checklist for DPT Drill Rigs provided in Attachment III. Additional inspections will be performed at least once every 10-day shift or following repairs.

- Insure all machine guarding is in place and properly adjusted.

- The work area around the point of operation will be graded to the extent possible to remove any trip hazards.

- The DPT operator will establish an equipment staging and laydown plan. The purpose of this is to keep the work area clear of clutter and slips, trips, and fall hazards.

During Drilling

- Minimize contact to the extent possible with contaminated tooling and environmental media. All potentially contaminated tooling will be placed on polyethylene sheeting during operations (not just thrown on the ground) to restrict potential cross contamination.

- Support functions (sampling and screening stations) will be maintained a minimum distance from the DPT drill rig of the height of the mast plus five feet or 25-feet whichever is greater to remove these activities from within physical hazard boundaries. These boundaries will be strictly enforced by site personnel.

- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the DPT rig.

- During maintenance, use only manufacturer provided/approved equipment replacement parts shall be employed.

- Only personnel absolutely essential to the work activity will be allowed in the exclusion zone. Site visitors will be escorted at all times.

After Drilling

- All equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the SHSO to determine cleanliness prior to moving to the next location, exiting the site, or prior to down time for maintenance.

- All motorized equipment will be fueled prior to the commencement of the day's activities.

- When not in use the DPT drill rigs will be shutdown, and emergency brakes set to prevent movement.

- All areas subjected to subsurface investigative methods will be restored to equal or better condition than original to remove any contamination brought to the surface and to remove any physical hazards. In situations where these hazards cannot be removed these areas will be barricaded to minimize the impact on field crews working in the area.

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TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NAS PENSACOLA, PENSACOLA, FLORIDA

Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Types and Action Levels	Personal Protective Equipment *(Items in italics are deemed optional as conditions or the FOL or SHSO require.)*	Decontamination Procedures
Mobilization/ Demobilization This activity includes, but not limited to: - Equipment Preparation and Inspection - Resource acquisition and unpacking of supplies - Site clearance and preparation – Utility clearances, etc. - Establish and construct access routes to sample/work locations, where applicable. - Construct decontamination and IDW operation and storage facilities, as applicable.	***Chemical hazards:*** 1) Exposure to identified site contaminants is not anticipated. However, follow manufacturer instructions provided on MSDS for chemicals brought on site. ***Physical hazards:*** 2) Lifting (strain/muscle pulls) 3) Cuts and lacerations 4) Pinches and compressions/Struck by 5) Slips, trips, and falls 6) Heavy equipment hazards (swinging booms, hydraulic lines, etc.) 7) Vehicular and foot traffic ***Natural hazards:*** 8) Ambient temperature extremes (heat/cold stress) 9) Insect and animal bites 10) Inclement weather	1) The on-site Hazard Communication Program (Section 5.0 TtNUS Health and Safety Guidance Manual) will be followed. All chemicals brought onto the site by Tetra Tech NUS and subcontractor personnel will be inventoried with each applicable chemical having an MSDS on site, on file. This effort shall include • Accurate Chemical Inventory List (Entries will match chemicals brought on-site, as the names appear on the MSDS and the label) This list shall also include quantities and storage locations will be maintained in a centralized location and made available upon request. • MSDS's will be maintained in a central location, accessible to all personnel. • All containers will have labels specifying the following information: - Chemical Identity (As it appears on the label, MSDS, and Chemical Inventory List) - Appropriate Warning (i.e., Eye and skin irritation, flammable, etc.) - Manufacturer's Name Address and Phone Number All personnel will be required to review the appropriate MSDS's if they are not familiar with the hazards of the chemicals to be used, prior to the use of a specified chemical substance. Information on hazards and PPE will be communicated on the Safe Work Permit for this task. Any specific provisions recommended by the MSDS shall be in place (i.e., eye wash, fire extinguisher, specified PPE, etc.) prior to using the chemical substance. 2) During mobilization/demobilization personnel are required to handle equipment, supplies, and resources in preparation for site activities. This hazard becomes more predominant in the early morning hours (prior to muscles becoming limber) and later in the day (as a result of fatigue). The following provisions shall be instituted in order to minimize hazards of this nature: • Use machinery or multiple personnel for heavy lifts, where possible. • Use proper lifting techniques - Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are obtainable. - Minimize the horizontal distance to the center of the lift to your center of gravity. - Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time. - Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive. - Plan your lifts – Place heavy items on shelves between the waist and chest; lighter items on higher shelves. - Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury. Other considerations associated with lifting injuries and muscle strains include • Area available to maneuver the lift. • Area of the lift – Work place clutter, slippery surfaces • Your Overall physical condition 3) To prevent cuts and lacerations associated with unpacking or packing equipment and supplies, during site preparation (clearing access routes), the following provisions are required: - Always cut away from yourself and others, then, if a knife slips, you will not impale yourself or others. - Do not place items to be cut in your hand or on your knee. - Change out blades as necessary to maintain a sharp cutting edge. Many accidents result from struggling with dull cutting instruments. If hand tools (brush hooks, machetes, etc.) are used to gain access to sample locations, the following precautions are recommended: - Ensure handles are of good construction (no cracks, splinters, loose heads/cutting apparatus. - Ensure all cutting tools are maintained. Blades shall be sharp without nicks and gouges in the blade. - All hand tools (brush hooks, machetes, etc.) with cutting blades shall be provided with a sheath to protect individuals when not in use and when carrying these items over rough or slippery terrain. - All personnel will maintain a 10-foot perimeter or greater around persons clearing brush and access paths to sample and/or well locations. 4) Do not modify tooling without manufacturer's expressed permission. - Keep any machine guarding in place, avoid moving parts. - Use tools or equipment where necessary to avoid placing hands in areas vulnerable to pinch points. - Adjust machine guarding as necessary to minimize access into the machine. - When staging equipment, insure all stacked loads, shelving, are adequately secure to avoid creating a hazard from falling objects. 5) **Preview work locations for unstable/uneven terrain.** - Cover, guard and barricade all open pits, ditches, and floor opening as necessary. - Ruts, roots, tools, and other tripping hazards should be eliminated to minimize trips and falls. - Maintain a clutter free work area. - As part of site control efforts construct fences or other means of demarcation (i.e. signs and postings) to control and isolate traffic in the work area. Means of demarcation shall also be constructed isolating resource and/or staging areas. 6) All equipment will be - Inspected in accordance with OSHA and manufacturer's design. - All equipment inspection will be documented on a Equipment Inspection Checklist as provided in (See Attachment III). - Operated by knowledgeable operators and ground crew. 7) As part of site preparation activities and zone construction, when preparing traffic and equipment considerations are to include the following: - Establish safe zones of approach (i.e. Boom or mast + 5 feet). See Table 5-1 for Soil boring/Monitoring Well Installation for recommended distances. - The mast will be lowered when moving the rig. - Foot and vehicular traffic routes shall be well defined. - Heavy equipment patterns shall be isolated using fences or other suitable barricades from pedestrian pathways. - Bumpers or other suitable traffic stops shall be placed in areas where it is desired that traffic approaching an drop offs or unprotected banks. - All self-propelled equipment with restricted vision moving backwards shall be equipped with back up warning systems. - The FOL and/or the SHSO as a precautionary measure to remove or demarcate physical hazards shall preview traffic routes (foot and vehicular) before the commitment of personnel and resources. 8) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat and cold stress is provided in Section 4.0 of the TtNUS Health and Safety Guidance Manual. 9) This is not considered a predominant hazard as these activities are to be conducted in a well maintained area on the corner of Murray and Taylor Roads. To combat the potential impact of natural hazards, the following actions are recommended Insects and spiders - Wear light color clothes. This will allow easier detection of ticks and insects crawling on your body. It will also assist in heat stress control. - Tape pant legs to work boots to block direct access. This is especially critical when clearing or entering heavy brush and wooded areas. - Do not stick your hand anywhere where you can't see. - Use repellents – Permanone should be applied liberally to the clothing, but not the skin as it may cause irritation. Concentrate on areas where ticks and other insects may access your body such as pant cuffs, shirt to pants, and collars. Products containing DEET may be applied directly to the skin. As always follow manufacturer's recommendations for use. - If you leave your workboots at the trailer or office over your break make sure you shake them out before sticking your feet in them. 10) Suspend or terminate operations until directed otherwise by SHSO. See Section 4.0 of the TtNUS Health and Safety Guidance Manual for additional information concerning natural hazards.	Visual observation of work practices by the FOL and/or the SHSO to minimize potential physical hazards (i.e., improper lifting, unsecured loads, cutting practices, etc.). Monitoring for chemical hazards is not required during this activity.	Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - *Snake chaps(for remote and unmaintained areas)* - *Safety glasses (for moving through brush and when involved in activities that could result in flying projectiles such as hammering or chopping and clearing brush)* - *Hardhat (when overhead hazards exists, or identified as a operation requirement)* - *Reflective vest for high traffic areas* - *Hearing protection for high noise areas (At the direction of the FOL and/or the SHSO).* As site conditions may change, the following equipment will be maintained during all on-site activities as prescribed in Section 2.0 of this HASP - Fire Extinguishers - First-aid kit ***Note:*** *The FOL and/or the SHSO will determine the number of fire extinguishers and first-aid kits to be made available based on the number of operations to be conducted at any given time.*	Not required. Good personal hygiene practices should be employed prior to breaks lunch or other period when hand to mouth contact occurs. This will minimize potential ingestion exposures. Personnel should inspect themselves and one another for the presence of ticks when exiting wooded areas, grassy fields, etc. This action will be employed to assist in stopping the transfer of these insects into vehicles, homes, and offices. In a review of a number of tick bites reported over the past few years, the ticks that went undetected were located on the back and in the shoulder areas. Have your buddy examine this area carefully.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NAS PENSACOLA, PENSACOLA, FLORIDA

Task/Operation/Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment *(Items in italics are deemed optional as conditions or the FOL or SHSO dictate.)*	Decontamination Procedures
Subsurface soil and groundwater sampling and installation of monitoring wells using DPT.	***Chemical hazards:*** 1) Previous analytical data identified contaminants associated with aviation gasoline including BTEX, naphthalene, PAHs, and lead. These contaminants of concern are unlikely to be encountered at concentrations that would pose an inhalation hazard to site personnel given the limited contact and disturbance of potentially contaminated media. Further information on these contaminants are presented in Section 6.1, and Table 6-1. 2) Transfer of contamination into clean areas or onto persons ***Physical hazards:*** 3) Heavy equipment hazards (pinch/compressions points, rotating equipment, hydraulic lines, etc.) 4) Noise in excess of 85 dBA 5) Energized systems (contact with underground or overhead utilities) 6) Lifting (strain/muscle pulls) 7) Slips, trips, and falls 8) Cuts and lacerations 9) Vehicular and foot traffic 10) Site Characterization/Operations Evaluations Further information on these physical hazards are provided in Section 4.0 of the HSGM. ***Natural hazards:*** 11) Inclement weather 12) Insect bites	1) – Air monitoring with an PID/FID will be the primary mechanism to detect measurable airborne concentrations of volatile organics associated with AVGAS. The use of PPE, Safe work practices, and good work hygiene practices will be used to minimize the potential for exposure and contact with site contaminants. Site activities are unlikely to generate airborne particulates what would present an inhalation route of exposure**.** Avoiding contact with contaminated media (air, water, soils, etc.) through proper use and application of PPE. Avoid hand to mouth contact to the extent possible wash hands and face or use hygienic wipes to remove potential contaminants from hands and face prior to breaks or lunch or other hand to mouth activities. It should be noted that exposure during DPT operations in an open air environment is not anticipated. Site activities are unlikely to disturb contaminated media to the extent necessary to create airborne concentrations of site contaminants that would present an inhalation hazard. 2) Restrict the cross use of equipment and supplies between locations and activities without first going through a suitable decontamination. Work practices including establishing a rigid decontamination procedure will be employed for all equipment between locations and between clean and potentially dirty work. This provision along with dedicated sampling equipment will insure materials are not carried and deposited in unaffected areas. 3) All equipment will be: - Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600.601.602), and manufacturer's design, as applicable. All inspections will be documented using the Equipment Inspection Checklist (for Drill Rigs) found in (See Attachment III**)** of this HASP. - Operated and supported by knowledgeable operators and ground crew. - Used within safe work zones, with routes of approach clearly demarcated. For DPT operations personnel (sample team) will remain at least 25 feet from the point of operation or the height of the mast plus 5-feet, whichever is greater. This will be the area identified as the exclusion zone for this task. See Section 10.1.1 of this HASP for more information concerning exclusion zone boundaries. - The exclusion zone boundary for soil borings performed using a hand auger will be 10-feet surrounding the borehole. - All self-propelled equipment with restricted field of vision moving backwards shall be equipped with a Back up alarm. - Areas will be inspected prior to the movement of the direct push rig and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SHSO. - See additional safe work procedures for drilling in Section 5.9 of this HASP as well as in Section 4.0 of the HSGM. 4) Hearing protection will be used during all subsurface activities using the DPT rig or when noise levels are >85 dBA. (during operation). Previous accumulated data indicates an average 8 hour exposure working behind a direct push rig during hydraulic and hammer advancement of the tooling is approximately 87-92 dBA.. Controlling this hazard shall be accomplished employing two separate approaches as follows: - Site control boundaries will be established to limit the affect of the noise hazard (See Item 3, 3rd bullet). - Hearing protection – As a general rule of thumb *Excessive noise levels (>85dBA) are being approached when you have to raise your voice to talk to someone within 2 feet of your location.* 5) All drilling activities will proceed in accordance with the utility clearance (locating and identification of utilities within the work area) provided by NAS Pensacola. As a redundant check TtNUS personnel will complete the Utility Locating Excavation Clearance SOP in Attachment II of this HASP. All utility clearances will be obtained in writing, and locations identified and marked, prior to activities. If it is not obtainable/unknown or you location infringes within 3-feet of an underground utility advancement must proceed by hand until past the utility. The hand dug hole must at least represent the same diameter of the mechanized tooling that will be used. 6) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques as described in Table 5-1 for mobilization/demobilization. Drill stems, auger flights, and well construction supplies are some of the common material that are handled and because of their weight will present a lifting strain hazard associated with this activity. 7) Preview work locations for unstable/uneven terrain. - Cover, guard and barricade all open pits, ditches, and floor opening as necessary. - Ruts, roots, tools, and other tripping hazards should be eliminated/demarcated to minimize trips and falls. - Maintain a clutter free work area. 8) To prevent cuts and lacerations, the following provisions are required: - Obtain and use the knife and acetate tube retention tub recommended by Geoprobe (Geoprobe Sampling Kit) to prevent potential cuts and lacerations when accessing samples within MacroCore acetate liners. These items have been engineered to allow sample acquisition without putting the sampler at risk. - Always cut away from yourself and others, then, if a knife slips, you will not impale yourself or others. - Do not place items to be cut in your hand or on your knee. - Change out blades as necessary to maintain a sharp cutting edge. Many accidents result from struggling with dull cutting attachments. - Wear cut-resistant gloves (leather or heavy cotton) at least on the non-knife hand. 9) Use traffic-warning signs, flag persons, and high visibility vests as determined by the SHSO when work infringes traffic thoroughfares. In addition, use physical barricades, when working within or altering normal traffic flow patterns/traffic lanes. See Section 4.0 of the HSGM for additional discussions as it pertains to the physical hazards discussed above. 10) Work areas will be surveyed prior to committing personnel or resources. The survey will be conducted by the FOL and/or the SHSO. The purpose is to identify physical and natural hazards that may impact the proposed work area. These hazards are to be identified, barricaded, or eliminated to the extent possible to minimize potential effect to field crew. During active operations the FOL and/or the SHSO shall audit operations to insure adherence to the elements specified within this HASP and the Safe Work Permit. Information derived from this evaluation shall be reviewed/discussed at the Daily Tool Box Meeting. Corrective measures shall be incorporated immediately or assigned as action items with a schedule to be corrected. The FOL/SHSO shall follow up on items identified to insure they are suitably addressed. 11) To minimize hazards of this nature, the following provisions shall be employed: - Wear appropriate clothing for weather conditions. - Provide acceptable shelter and replacement liquids for field crews as relief from excessive ambient temperatures. - Under conditions of elevated levels of PPE, periods of acclimatization, excessive ambient temperature extremes, or if you believe someone is suffering from a heat/cold related disorder, it may be necessary to conduct heat/cold stress monitoring. - Electrical storms/high winds - Suspend or terminate operations until directed otherwise by SHSO. Follow the provisions as specified in Section 4.0 of the Tetra Tech NUS, Inc. Health and Safety Guidance Manual regarding the identification and evaluation of heat/cold stress related conditions. 12) These hazards are not anticipated to be as predominant within this area as it is an active area that is regularly maintained.	1) Monitoring shall be conducted to evaluate source concentrations of on-site contaminants in support of the prescribed worker protection levels. Monitoring shall be conducted using a PID/FID. Sustained readings in worker breathing zone greater than 5 ppm will require site activities to be periodically suspended until the readings subside or work can be performed in an area free of elevated readings. If readings do not subside, contact the PHSO. Monitoring shall be conducted at the prescribed depths as indicated on the boring logs at the source (borehole) and drillers breathing zone. Monitoring shall also be conducted at the sampler's location to in the same prescribed frequency when handling samples. Noise monitoring maybe conducted at the discretion of the PHSO and/or the SHSO. Action Level - >85 dBA Participation in the Project Hearing Conservation Program. Hearing protection is required for this operation.	All soil boring operations and monitoring well installation will be initiated in Level D protection, including the following articles: Sampler/Oversight Personnel - Standard field dress (long pants, Sleeved shirts) - Steel toe safety shoes or work boots - Hard hat(when within 25-feet of the DPT rig) - Safety Glasses(when within 25-feet of the DPT rig or when sampling) - Nitrile surgeon style inner gloves for sampling - Hearing protection(when within 25-feet of an operating DPT rig) - *Impermeable boot covers* - *Reflective vest for traffic areas* **Driller and Driller Helper** - Standard field attire including sleeved shirt and long pants - Safety shoes (Steel toe/shank) - Safety glasses - Nitrile inner and outer gloves or supported neoprene - Hearing protection - Hard hat - *Impermeable boot covers* **Upgrades to Level C and B protection** are not anticipated. **Note:** Use of respiratory protection will require the implementation of the Tetra Tech NUS, Inc. Respiratory Protection Program provided in the Health and safety Guidance Manual. As site conditions may change, the following equipment will be maintained during all on-site activities - Fire Extinguishers - First-aid Kit **Note:** The Safe Work Permit(s) for this task (See Attachment IV of this HASP) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** will consist of a - Remove visible soils from dedicated equipment rinse and bag for disposal. - Handi-Wipes or similar product will be used to clean hands, prior to moving to the next location. Hands and face should be washed and rinsed as soon as possible especially before breaks, lunch, or other hand to mouth activities. **Equipment Decontamination** – Drill stems and components will be decontaminated in the following manner 1. Remove to the extent possible visible dirt. 2. Soap and water wash and rinse 3. For all components that may contact the sample media – Isopropanol rinse (i.e., cutting shoe) 4. Deionized rinse 5. Air dry 6. Scan with FID to insure the removal of potential contaminants and decontamination solvent. 7. Positive results – re-rinse, re-scan. If necessary repeat the decontamination procedure. The FOL or the SHSO will be responsible for evaluating equipment arriving on-site, leaving the site, and between locations. No equipment will be authorized access, exit, or movement to another location without this evaluation.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NAS PENSACOLA, PENSACOLA, FLORIDA

Tasks/Operation/Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment *(Items in italics are deemed optional as conditions or the FOL or SHSO requird.)*	Decontamination Procedures
Decontamination of soil sampling and well installation equipment will be completed using portable containers to wash and rinse this equipment. It is anticipated that this activity will take place at the sample location or at a temporary centralized location.	1) Previous analytical data identified contaminants associated with aviation gasoline including BTEX, naphthalene, PAHs, and lead. These contaminants of concern are unlikely to be encountered at concentrations that would pose an exposure threat to site personnel given the limited potential for contact during decontamination efforts. Further information on these contaminants are presented in Section 6.1, and Table 6-1. 2) Decontamination fluids - Liquinox (detergent); isopropanol (decontamination solvent) ***Physical hazards:*** 3) Lifting (strain/muscle pulls) 4) Pinches and compressions ***Natural hazards:*** 8) Inclement weather	1) and 2) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Control potential non-occupational exposures through good work hygiene practices (i.e., avoid hand to mouth contact; wash hands and face before breaks and lunch; minimize contact with contaminated media). Obtain and familiarize yourself with manufacturer's MSDS for any decontamination fluids used on-site. Solvents may only be used in well-ventilated areas, such as outdoors. Use appropriate PPE as identified on MSDS or within this HASP. All chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication Program provided in Section 5.0 of the TtNUS Health and Safety Guidance Manual. 3) Use multiple persons where necessary for lifting and handling heavy equipment for decontamination purposes. - Employ proper lifting techniques as described in Table 5-1, Mobilization/Demobilization. 4) The potential for pinches and compressions during this activity is largely associated with wrenches slipping during the disassembling of sampling equipment (MacroCore samplers; drill tubes, etc.) To combat this potential hazard - Do not push the wrench in the direction of an immovable object in case that it slips. - Do not use cheater pipes or similar equipment to increase leverage. - Use the proper tool for the job 8) Suspend or terminate operations until directed otherwise by SHSO.	Use visual observation and real-time monitoring instrumentation to ensure all equipment has been properly cleaned of contamination and dried. Monitoring instrumentation will be employed to determine If contaminants and all of the decontamination solvent (isopropanol) (where use is applicable) has been removed through the rinse process. Any positive indication/results greater than background require the article that has been decontaminated to be re-rinsed and scanned again. If necessary this process should be repeated until no measurable indication of contaminants and/or the decontamination solvent exists.	**For sampling equipment** (trowels, split spoons,, etc.), the following PPE is required **Note**: Consult MSDS for additional PPE guidance. Otherwise, observe the following. Level D Minimum requirements - - Standard field attire (Long sleeve shirt; long pants) - Safety shoes (Steel toe/shank) - Nitrile outer gloves over nitrile inner gloves - Safety glasses - *Impermeable apron* **Note:** The Safe Work Permit(s) for this task (See Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** will consist of a soap/water wash and rinse for reusable and non-reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). The sequential procedure is as follows: Stage 1: Equipment drop, remove outer protective wrapping; personnel will wash hand tools and pass hand equipment through as necessary. Stage 2: Soap/water wash and rinse of outer boots and gloves Stage 3: Soap/water wash and rinse of the outer splash suit or apron as applicable Stage 4: Disposable PPE will be removed and bagged. Stage 5: Wash face and hands **Sampling Equipment Decontamination** 1. Remove heavy materials (soils, etc.) 2. Alconox or Liquinox detergent wash 3. Potable water rinse 4. Solvent rinse (Isopropanol) 5. DI water rinse 6. Air dry 7. Scan with FID All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site. The FOL or the SHSO will be responsible for evaluating equipment arriving on-site, leaving the site, and between locations. No equipment will be authorized access, exit, or movement to another location without this evaluation.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NAS PENSACOLA, PENSACOLA, FLORIDA

Tasks/Operation/**Locations**	**Anticipated Hazards**	**Recommended Control Measures**	**Hazard Monitoring - Type And Action Levels**	**Personal Protective Equipment** *(Items in italics are deemed optional as conditions or the FOL or the SHSO required.)*	**Decontamination Procedures**
IDW Management and Handling This activity includes the following tasks: - Containerization - Labeling - Staging - Monitoring of IDW generated in support of site activities. Soils will be loaded into a roll-off box; waters will be containerized in 55-gallon drums. Dedicated equipment including - PPE - Tubing - Disposable trowels, etc. Will have any visible materials removed then rinsed with potable water prior to disposal as normal refuse.	***Chemical hazards:*** The only anticipated chemical hazard associated with IDW management is the potential for a spill. In situations such as that the spill containment program identified in Section 9.0 of this HASP will be employed. ***Physical hazards:*** 1) Strains and sprains 2) Back injuries 3) Compressions 4) Loading bulk transport containers	It is not anticipated that chemical hazards will be significant during this operation, as the IDW will be in sealed containers. It is anticipated that the IDW will represent a limited chemical hazard, if the container is breached. Control measures in this case will represent PPE and good work hygiene practices to control potential exposures during the implementation of the Spill Containment Program (See Section 9.0 of this HASP). 55-Gallon Drums – Drums will be handled in the following manner - All drums will be closed and sealed when not in use - Drums will be properly labeled as indicated below - The outer shell will be wiped down as necessary Temporary containers (water containers, buckets, etc.) will be - Properly labeled - When working at a well sampling, plastic or preferably a mortar tub will be used to provide secondary containment for incidental spills during sampling - A bucket of wash water will be readily available to rinse dedicated equipment prior to disposal. 1 & 2) Strains and sprains (lifting hazards)/Back Injuries – The predominant hazard associated with this activity is the movement of full or partially full 55-gallon drums of water and/or soil. To minimize hazards of this nature the following provisions shall be incorporated as applicable: - Use machinery (preferred method) or multiple personnel for heavy lifts - Use proper lifting techniques a. Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are available. b. Minimize the horizontal distance to the center of the lift to your center of gravity. c. Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time. d. Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive. e. Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury. In determining whether you can lift or move an item several factors must be considered, these are as follows: - Area available to maneuver the lift. - Area of the lift – Work place clutter, slippery surfaces, rough terrain - Overall physical condition **3)** Compressions – Another hazard frequently associated with this task is the compression of hands and fingers when placing the containers on pallets. This typically occurs when rolling and lowering the container in its place. To combat this hazard, the following provision shall be employed: Material handling devices shall be used for moving drums within the satellite storage area. This includes drum dollies with pneumatic tires, drum grapplers, etc. to handle drums of IDW. These pieces of equipment are engineered to allow placement of these containers while keeping hands from pinch/compression points. **Reminder:** The drums you are attempting to move, lift and/or relocate may weigh on the average of - 55-Gallon container of purge or decontamination waters = 475 lbs. (including the container) Satellite Storage Area – Emphasis has been placed on the physical surroundings and how they can influence the potential hazards associated with material handling aspects of this task. To further reduce material handling hazards, support spill containment and control, and sampling when necessary, the IDW storage area should be structured as follows: - Maximum 4-drums to a pallet with retaining ring bolt and label on the outside for easy access/reference. - Maintain a minimum of 4-feet between each row of pallets. This is the minimum distance necessary to wheel drums on a drum dolley - If the site is not secured, the satellite storage area shall be fenced and signs placed indicating the following: a. Primary Point of Contact (Preferably someone at the Base, and make sure they know they been identified as the Primary Point of Contact). b. Phone Number c. Emergency Contact (If different from the Primary) - Provide a Drum/Container Inventory to the Primary Point of Contact and to Emergency Services, if they deem it necessary. The inventory should contain: a. Each drum shall be assigned a unique identification number. This number shall be placed on the label and drum shell using a paint marker (Note: Do not paint the number on the lid as these have a tendency to get exchanged from time to time.) b. Types of waste materials (Subsurface soils, drill cuttings; purge/development waters, etc.) c. Volumes (Full or level associated with the container after completion of the project location) d. Where it was derived from (IDW should be separated by SWMU and media) e. Dates (For all filled containers and at the completion of work for that area or SWMU) f. Contact – For more information Note: All drums should be labeled with the same information.	None Required, unless spill containment provisions are invoked. Then monitoring will proceed as described in the activity associated with the task when the materials were generated such as Soil boring or well installation.	Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - Leather or canvas work gloves - *Safety glasses (When utilizing cables or slings to move the containers)* - *Hardhat (when overhead hazards exists, or identified as a operation requirement)* PPE changes may be made with the implementation of the Spill Containment Program. This represents the only anticipated modification to this level of protection.	Not required, unless the implementation of the Spill Containment Program is required due to a spill and/or release. At that point the decontamination procedures for those activities such as soil borings and/or well installation. The reference reflects the tasks conducted when the materials were generated.

6.0 HAZARD ASSESSMENT

This section provides information regarding the chemical, physical, and natural hazards associated with the sites to be investigated and the activities that are to be conducted as part of the scope of work. Table 6-1 provides information on potential chemical contaminants, including exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data.

6.1 CHEMICAL HAZARDS

DPT activities typically do not result in the disturbance of significant quantities of media (soil) which would increase the likelihood of generating airborne concentrations of site contaminants. Potential health hazards associated with Site 22 include inhalation, ingestion, and dermal contact of various contaminants that may be present in shallow and deep soils and groundwater. As the focus of this field investigation is to sample various media, concentrations of the chemical hazards present may not be fully characterized. Based on the site history and the most recent sampling efforts, aviation gasoline (AVGAS) constituents (particularly BTEX), naphthalene, PAHs, and metals (primarily lead) have been identified as the primary contaminants of concern.

6.2 PHYSICAL HAZARDS

In addition to the chemical hazards discussed above, the following physical hazards may be present during the performance of the site activities.

- Slips, trips, and falls
- Cuts (or other injuries associated with hand tool use)
- Lifting (strain/muscle pulls)
- Ambient temperature extremes (cold and heat stress)
- Pinches and compressions
- Heavy equipment hazards (rotating equipment, hydraulic lines, etc.)
- Energized systems (contact with underground or overhead utilities)
- Vehicular and foot traffic
- Noise in excess of 85 dBA
- Flying projectiles

Each of these physical hazards is discussed in greater detail in Section 4.0 of the TtNUS health and Safety Guidance Manual. Additionally, information on the associated control measures for these hazards are discussed in Table 5-1 of this HASP.

TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NAS PENSACOLA, FLORIDA

Substance	CAS No.	Air Monitoring	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
AVGas (Aviation Gasoline) Composition Naphtha (petroleum), light alkylation; 64741-66-8 (>90%) Toluene; 108-88-3(up to 10%) Benzene; 71-43-2 (0.5-5%) Hexane; 110-54-3 (0-3%) 1,2,4-Trimethylbenzene; 95-63-6 (0-2%) Organic lead additives (up to 0.14%)	See component list	PID (10.6 eV Lamp Strength Correction factor = 0.6 FID = 150 LEL Meter = 0.85	Manufacturer's Recommendation – 100 ppm (300 mg/m^3) for 8-Hour work day. No regulatory or advisory limits have been set.	Petroleum odor threshold ~ 800 ppm Rating - Poor to Adequate **Recommended Air Purifying cartridges:** Organic vapor **Recommended gloves:** NitrilSolve 727 (>480 minutes) or Neoprene 6780 (287 minutes)	**Characteristics vary by fuel blending, grade, and manufacturer (e.g., impurities and additives)** **Boiling Pt: 158ºF, ~70ºC** **Melting Pt: -72º F; -58ºC** **Molecular Weight: ~86-170** **Flash Pt: -50ºF, -45ºC** **LEL: 1.4%** **UEL: 7.6%** **Auto ignition Temp.:824ºF; 439ºC** **Vapor Density: ~4** **Vapor Pressure: 5.5 to 7.0 psi** **SG: 0.71@ 60º F; 15.6ºC** **PH: ~7.0** **Solubility in water: Negligible (<0.1%) @ 77ºF; 25ºC** **Viscosity: 0.6 cST@ 77ºF; 25ºC** **Appearance and Odor: Clear green liquid with gasoline hydrocarbon odor** **Avoid contact with heat, sparks and flame**	AVGas is irritating to the eyes, skin, respiratory tract, and CNS. **Direct contact** may result in mild irritation with a possible drying and defatting of the skin. **Ingestion** may result in gastrointestinal irritation, nausea, and vomiting and may be harmful or even fatal. I**nhalation** of vapors or mists of AVGas may result in headache, nausea, confusion, narcotic effect, and drowsiness. Acute exposures to extreme airborne concentration can result in death. Chronic inhalation of aviation gas vapors may produce symptoms such as fatigue, anxiety, mood changes, liver and kidney damage, and memory difficulties in exposed workers. Repeated exposures to the skin may cause skin cancer. This product does contain components which have demonstrated carcinogenic capabilities.
Lead	7439-92-1	Particulate form - Unable to be detected by either PID or FID.	OSHA: 0.05 mg/m^3 ACGIH: 0.05 mg/m^3 NIOSH: 0.10 mg/m^3 IDLH: 100 mg/m^3 as lead	The use of a air purifying, full-face respirator with high efficiency particulate air filter for up to 2.5 mg/m^3. **Recommended gloves:** This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	**Boiling Pt:** 3164°F; 1740°C **Melting Pt:** 621°F; 327°C **Solubility:** Insoluble **Flash Pt:** Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) **LEL/LFL:** Not applicable **UEL/UFL:** Not applicable **Vapor Density:** Not available **Vapor Pressure:** 0 mmHg **Specific Gravity:** 11.34 **Incompatibilities:** Strong oxidizers, peroxides, sodium acetylide, zirconium, and acids **Appearance and Odor:** Metal: A heavy ductile, soft gray solid.	Overexposure to this substance via ingestion or inhalation may result in metallic taste in the mouth, dry throat, thirst, Gastrointestinal disorders (burning stomach pain, nausea, vomiting, possible diarrhea sometimes bloody or black, accompanied by severe bouts of colic), CNS effects (muscular weakness, pain, cramps, headaches, insomnia, depression, partial paralysis possibly coma and death. Extended exposure may result in damage to the kidneys, gingival lead line, brain, and anemia.

TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NAS PENSACOLA, FLORIDA

Substance	CAS No.	Air Monitoring	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Benzene	71-43-2	PID: I.P 9.24 eV, 100% response with PID and 10.2 eV lamp. FID: 150% relative response ratio with FID.	OSHA: 1 ppm ACGIH: 05 ppm NIOSH: 0.1 ppm IDLH: 500 ppm	Inadequate - Odor threshold 34-199 ppm. OSHA accepts the use of air-purifying respirators with organic vapor cartridge up to 10 ppm despite the inadequate warning properties providing cartridges are changed at the beginning of each shift. Recommended gloves: Butyl/neoprene blend - >8.00 hrs; Silver shield as a liner - >8.00 hrs; Viton - >8.00 hrs	**Boiling Pt: 176°F; 80°C** **Melting Pt: 42°F; 5.5°C** **Solubility: 0.07%** **Flash Pt: 12°F; -11°C** **LEL/LFL: 1.3%** **UEL/UFL: 7.9%** **Vapor Density: 2.77** **Vapor Pressure: 75 mmHg** **Specific Gravity: 0.88** **Incompatibilities: Strong oxidizers, fluorides, perchlorates, and acids** **Appearance and Odor: Colorless to a light yellow liquid with an aromatic odor**	Overexposure may result in irritation to the eyes, nose, throat, and respiratory system. CNS effects include giddiness, lightheadedness, headaches, staggered gait, fatigue, and lassitude and depression. Additional effects may include nausea. Long duration exposures may result in respiratory collapse. Regulated as an OSHA carcinogen. May cause damage to the blood forming organs and may cause a form of cancer called leukemia.

6.3 NATURAL HAZARDS

Insect/animal bites and stings, poisonous plants, and inclement weather are natural hazards that may be present given the location of activities to be conducted. As previously discussed, this area is well maintained and therefore hazards of this nature are not considered predominant hazards.

For more information concerning these hazards see Section 4.0 of the HSGM. The following information is specific to the region and therefore not in the HSGM.

Insect Bites and Stings

Various insects and animals may be present and should be considered even in a light industrial setting. For example, fire ants present a unique situation when working outdoors in the southern portion of the United States. Their aggressive behavior and their ability to sting repeatedly can pose a unique health threat. The sting injects venom (formic acid) that causes an extreme burning sensation. Pustules form which can become infected if scratched. Allergic reactions of people sensitive to the venom include dizziness, swelling, shock and in extreme cases unconsciousness and death. People exhibiting such symptoms should see a physician. Fire ants can be identified by their habitat. They build mounds in open sunny areas sometimes supported by a wall or shrub (well pads). The mound has no external opening. The size of the mound can range from a few inches across to some which are in excess of two feet or more in height and diameter. When disturbed they defend it by swarming out and over the mound, even running up grass blades and sticks.

Insect/animal bites and stings are difficult to control given the climate and environmental setting of NAS Pensacola. However, in an effort to minimize this hazard the following control measures will be implemented where possible.

- Commercially available bug sprays and repellents will be used whenever possible – Pesticides analytical screening includes chlordane, endrin, lindane, methoxychlor, toxaphene and heptachlor. Commercially available repellants may be used providing they don't contain substances which appear on the analytical list for pesticide analysis. Products such as Permanone (containing Permithrin) should not be applied directly to the skin due to potential irritation. This product, when permitted for use, should be applied over clothing articles. Products such as DEET can be applied directly to the skin. In all cases follow the manufacturer's instructions.

- Where possible, loose-fitting and light-colored clothing with long sleeves should be worn. This will also aid in insect control by providing a barrier between the field person and the insects and to provide easy recognition of crawling insects against the lighter background. Pant legs should be

secured to the work-boots using duct tape to prevent access by ticks. Mosquito nets are also recommended for use when commercially available repellents are not permitted.

- Clothing/limited body checks for ticks and other crawling insects should be conducted upon exiting heavily vegetated and grassy areas. Workers should perform a more detailed check of themselves when showering in the evening. While is has been reported that ticks prefer moist areas of the body (arm-pits, genitals, etc.) and will migrate to those locations. However, in many of the reported cases attachment has occurred on the back near the shoulders where they are hard to detect and remove.

- The FOL/SHSO will preview access routes and work areas in an effort to identify physical hazards including nesting areas in and around the work sites. These areas will be flagged and communicated to site personnel. Do NOT destroy Fire ant nest or otherwise harass them is the best way to avoid being bitten.

- The FOL/SHSO must determine if site personnel (through completion of Medical Data Sheets), suffer allergic reactions to bee and other insect stings and bites. Field crew members who are allergic to bites should have their emergency kit containing antihistamine or prescribed antidote readily available.

Any allergies (insect bites, bee stings, etc.) must be reported on the Medical Data Sheet and to the SHSO.

6.3.1.1 Tick and Mosquito Transmitted Illnesses and Diseases

Ticks and mosquitoes have been identified in the transmission of diseases including Lyme's disease and malaria. Warm months (Spring through early Fall) are the most predominant time for this hazard. Information concerning Lyme's Disease including recognition, evaluation, tick removal, and control is provided in Section 4.0 of the TtNUS Health and Safety Guidance Manual.

Malaria may occur when a mosquito or other infected insect sucks blood from an infected person, and the insect becomes the carrier to infect other hosts. The parasite reproduces within the mosquito, and is then passed on to another person through the biting action. Acute symptoms include chills accompanied by fever and general flu like symptoms. This generally terminates in a sweating stage. These symptoms may recur every 48 to 72 hours.

6.3.1.1.1 West Nile Virus (WNV)

The WNV is a type of virus that causes encephalitis or inflammation of the brain. The virus is transmitted by mosquitoes that acquire it from infected birds. Symptoms generally occur five to 15 days following the

bite of an infected mosquito, and range from a slight fever or headache to rapid onset of severe headache, high fever, stiff neck, muscle weakness, disorientation and possibly death.

WNV encephalitis has no specific treatment. In northern areas of the world, WNV encephalitis cases occur primarily in the late summer or early fall. In southern climates, where temperatures are milder, WNV encephalitis can occur year round. There is no vaccine.

Precautions include, where possible:

- Limit outdoor activities during peak mosquito times – at dusk and dawn.
- Avoid standing water
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Apply insect repellent according to manufacturer's instruction to exposed skin. An effective repellent will contain 20% to 30% DEET (N,N-diethyl-meta-toluamide). Avoid products containing more than 30% DEET.
- Spray clothing with repellents such as Permanone containing permethrin or DEET, mosquitoes may bite through thin clothing.

6.3.2 Snakes of Florida

While this hazard is not anticipated it cannot be fully ruled out. The poisonous snakes found in Florida are the coral snake, cottonmouth or water moccasin, copperhead, and the pygmy, timber, and diamondback rattlesnakes. Initial efforts will be directed to avoid, where possible, nesting and territorial areas. Again, it is not anticipated that these reptiles will be encountered the following is provided only for informational purposes.

Coral Snake

Coral Snakes are extremely poisonous snakes with small, blunt heads and brightly colored bodies. They do not strike as effectively as other venomous snakes, but they bite. They are dangerous if stepped on or handled. The *eastern* coral snake generally ranges from 20 to 40 inches in length. Its body is encircled by broad black and red bands separated by narrow yellow ones. Just behind the snake's black snout is a wide yellow band followed by a black band. Some are covered with black pigment that hides much of the red color. Some nonpoisonous snakes look like coral snakes because they have similar coloring. But coral snakes have red bands next to yellow ones. The harmless snakes have red bands next to black ones.

Cotton Mouth or Water Moccasin

The water moccasin is a pit viper. It has a hollow, or pit, in the side of its head, between and slightly below the eye and nostril. Several harmless water snakes have a broad head like the moccasin, but they lack the pit. Adult water moccasins are about 3 ½ feet long, though some grow to more than 5 feet long. They usually have broad dark bands across their bodies. Water moccasins feed on a wide variety of animals, including frogs, fish, small mammals, and birds. Water moccasins are most often seen in watery places, in the swampy backwaters of rivers and streams, and on marshy lakeshores. The bite of the water moccasin is highly dangerous and may be fatal. This snake is also called a cottonmouth because when threatened it throws back its head and flashes its white-lined mouth as a warning signal.

Copperhead

The copperhead snake is also poisonous. Its body has broad chestnut-red bands. Most copperheads are about 2 ½ feet long while the largest grow to about 4 feet. The copperhead bites people more often than most rattlesnakes, partly because it is silent and smaller, and is not so quickly noticed. The bite is seldom fatal to adults. This reptile usually eats rodents and other small mammals by killing them with their poison and swallowing them whole. Sometimes the snake eats insects and frogs. The copperhead can be identified by the presence of a pit in front of and below each eye. The snake's nostril is in front of the pit.

Rattlesnake

The rattlesnake is a pit viper with a rattle on the end of its tail. The rattle is used to warn enemies to stay away. However, sometimes they give no warning before they bite. The rattlesnake always lifts its tail when it sounds where as harmless snakes that mimic the rattlesnake move their tail back and forth on top of dry leaves or grass.

The diamondback rattler is the heaviest of the poisonous snakes, though not the longest. It gets its name because diamond-shaped blotches edged with yellow cover its body. Diamondbacks rarely grow over feet long.

Pigmy rattlesnakes are short, relatively thick-bodied snakes. They have a dark line through the eye on each side of the face and a series of dark, roughly circular spots running down the center of the back. These dorsal spots interrupt a thin reddish-orange stripe that runs along the midbody line. Pigmy rattlesnakes first line of defense is to remain motionless. Their color pattern makes them hard to see in grass or leaf litter, especially when they are coiled. They almost never warn approaching people by sounding their rattle. They are likely to remain motionless until stepped on or over.

The Timber Rattlesnake has a large body and ranges in length of five to six feet. It has a broad triangular head, vertical pupils and heat sensitive pits. The body color may be yellow, gray, dark brown or black, with dark, V-shaped crossbands across the back. The head is usually unpatterned and is covered with many small scales. A distinct rattle on the end of a darkly colored tail produces a buzzing sound when vibrated.

Rattlesnakes send out poison through two long hollow fangs, in its upper jaw. The poison forms in a pair of glands behind each eye on the upper jaw. The rattlesnake's fangs are folded back in the mouth when not in use. When an angry rattlesnake strikes, the fangs are erected and the mouth opened wide. Most rattlesnakes eat birds, small mammals, amphibians and reptiles. The larger rattlers rank among the most dangerous of snakes and should be avoided

6.3.2.1 Snake Bite

However, should field personnel come in contact with these animals and receive a bite, the following actions are necessary:

- Obtain a detailed description of the snake. This and the bite mark will enable medical personnel administering medical aid to provide prompt and correct antidotes, as necessary.

- Immobilize the bite victim to the extent possible. Physical exertion will mobilize the toxins (if poisonous varieties) from the bite point systemically through the body.

- Apply a pressure wrap (for extremities), just above and over the bite area. With a couple wraps of the pressure wrap in place over the bite area, apply a splint, and continue the application of the pressure wrap. The purpose for the splint is to restrict the movement of the extremity, this along with the pressure wrap will aid in restricting the toxins from leaving the site of the bite.

- Seek medical attention immediately.

Inclement Weather

Project tasks under this Scope of Work will be performed outdoors. As a result, inclement weather may be encountered. In the event that adverse weather conditions arise (electrical storms, high winds, extreme heat, etc.), the FOL and/or the SHSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist.

6.3.2.2 Heat Strain Symptoms

Excessive temperature extremes are considered inclement weather. Given the location and time of the year that work is to be conducted Table 6-4 is provided as a guide to Heat Strain Symptoms.

TABLE 6-2

HEAT STRAIN SYMPTOMS

STOP WORK if Any Worker Demonstrates Any of the Following

Heart Rate	Sustained (several minutes) heart rate minus worker's age > than 180 beats per minute (bpm) measured at any time.
Body Core Temperature	> 101.3ºF (38.5º C)
Recovery Heart Rate	> 110 bpm (Measured 1 minute after peak work effort)
Other symptoms	Sudden and sever fatigue, nausea, dizziness, or headache

Individuals May Be At Greater Risk of Heat Stress If:

Profuse sweating is sustained over hours

Weight loss over a shift is > 1.5% of beginning body weight

24-hour urinary sodium excretion is less than 50 nmoles

7.0 HAZARD MONITORING – TYPES AND ACTION LEVELS

Direct reading instruments will be used at the sites to evaluate the presence of detectable site contaminants and other potentially hazardous conditions. As a result, specific air monitoring measures and requirements are established in Table 5-1 pertaining to the specific hazards and tasks of an identified operation.

7.1 INSTRUMENTS AND USE

Instruments will be used primarily to monitor source points and worker breathing zone areas, while observing instrument action levels. Action levels are discussed in Table 5-1 as they may apply to a specific task or location.

Photoionization (PID) / Flame Ionization Detector (FID)

In order to accurately monitor for any substances which may present an exposure potential to site personnel, a PID or FID will be used. This instrument will be used to monitor potential source areas (boreholes, monitoring wells, etc.) and to screen the breathing zones of employees during site activities. The PID/FID has been selected because it is most effective in detecting potential organic vapors of concern as well as required for screening sample media.

The PID/FID will serve as the general screening instrument. In the unlikely event that readings greater than 5 ppm are sustained in the workers breathing zone, site activities will be temporarily suspended until readings return to background levels. Given the limited disturbance of potentially contaminated media, it is unlikely that sustained elevated readings will be present in worker breathing zones during the course of site activities.

Prior to the commencement of any field activities, the background levels of the site must be determined and noted. Daily background readings will be taken away from any areas of potential contamination. These readings, any influencing conditions (i.e., weather, temperature, humidity) and site location must be documented in the field operations logbook or other site documentation (e.g., sample log sheet).

Hazard Monitoring Frequency

Table 5-1 presents the frequencies that hazard monitoring will be performed as well as the action levels which will initiate the use of elevated levels of protection. The SHSO may decide to increases these frequencies based on instrument responses and site observations. The frequency at which monitoring is performed will not be reduced without the prior consent of the PHSO or HSM.

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the Tetra Tech NUS Equipment Manager and/or rental service employed. Operational checks and field calibration will be performed on the instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer's recommendations (for example, the Particulate Meter must be field calibrated daily and an additional field calibration must be performed at the end of each day to determine any significant instrument drift). These operational checks and calibration efforts will be performed in a manner that complies with the employee's health and safety training, the manufacturer's recommendations, and with the applicable manufacturer standard operating procedure. All calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration activities. This information may instead be recorded in a field operations logbook, provided that the information specified in Figure 7-1 is recorded. This required information includes the following:

- Date calibration was performed
- Individual calibrating the instrument
- Instrument name, model, and serial number
- Any relevant instrument settings and resultant readings (before and after) calibration
- Identification of the calibration standard (lot no., source concentration, supplier)
- Any relevant comments or remarks

7.3 INSTRUMENT DOCUMENTATION

The SHSO is responsible for ensuring that air monitoring instruments are used in accordance with the specifications of this HASP and with manufacturer's specifications/recommendations. In addition, the SHSO is also responsible for ensuring that the instrument use is documented. This requirement can be satisfied either by recording instrument readings on pre-printed sampling log sheets or in a field log book. This includes the requirement for documenting instrument readings that indicate no elevated readings above noted daily background levels (i.e., no-exposure readings). At a minimum, the SHSO must document the following information for each use of an air monitoring device:

- Date, time, and duration of the reading
- Site location where the reading was obtained
- Instrument used (e.g., LEL/02 meter, etc.)
- Personnel present at the area where the reading was noted
- Other conditions that are considered relevant to the SHSO (such as weather conditions, possible instrument interferences, etc.)

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: _____ **PROJECT NO.:** _____

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

This section specifies health and safety training and medical surveillance requirements for both Tetra Tech NUS and subcontractor personnel participating in on site activities.

Requirements For Tetra Tech NUS, Inc. and Subcontractor Personnel

Tetra Tech NUS and subcontractor personnel who will engage in field associated activities as described in this HASP must have:

- Completed 40 hours of introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120(e).
- Completed 8-Hour Refresher Training, if the identified persons had introductory training more than 12 months prior to site work.
- Completed 8-hour Supervisory training in accordance with 29 CFR 1910.120(e)(4), if their assigned function will involve the supervision of subordinate personnel.

Documentation of introductory training or equivalent work experience, supervisory, and refresher training as well as site-specific training will be maintained at the site. Copies of certificates or other official documentation will be used to fulfill this requirement.

8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to TtNUS employees and subcontractor personnel who will perform work on this project.

Figure 8-1 will be used to document the provision and content of the project-specific and associated training. Site personnel will be required to sign this form prior to commencement of site activities.

TtNUS will conduct a pre-activities training session prior to initiating site work. Additionally, a brief meeting will be held daily to discuss operations planned for that day. At the end of the workday, a short meeting may be held to discuss the operations completed and any problems encountered. This activity will be supported through the use of a Safe Work Permit System (See Section 10.2).

8.3 MEDICAL SURVEILLANCE

Medical Surveillance Requirements for Tetra Tech NUS and Subcontractor Personnel

Tetra Tech NUS and subcontractor personnel participating in project field activities will have had a physical examination. Physical examinations shall meet the minimum requirements of paragraph (f) of OSHA 29 CFR 1910.120. The physical examinations will be performed to ensure that personnel are medically qualified to perform hazardous waste site work using respiratory protection.

Documentation for medical clearances will be maintained at the job site and made available, as necessary. Subcontractor personnel may use an alternative documentation for this purpose. The "Subcontractor Medical Approval Form" can be used to satisfy this requirement, or a letter from an officer of the company. The letter should state that the persons listed in the letter participate in a medical surveillance program meeting the requirements contained in paragraph (f) of Title 29 of the Code of Federal Regulations (CFR), Part 1910.120, entitled "Hazardous Waste Operations and Emergency Response." The letter should further state the following:

- The persons listed have had physical examinations under this program within the frequency as determined sufficient by their occupational health care provider
- Date of the exam
- The persons identified have been cleared, by a licensed physician, to perform hazardous waste site work and to wear positive- and negative- pressure respiratory protection.

A sample Subcontractor Medical Approval Form and form letter have been provided to eligible subcontractors in the Bid Specification package.

Requirements for Field Personnel

Each field team member, including subcontractors and visitors, entering the exclusion zone(s) shall be required to complete and submit a copy of the Medical Data Sheet that is available in Attachment V of this HASP. This shall be provided to the SHSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SUBCONTRACTOR EXCEPTION

If through the execution of their contract elements the subcontractor will not enter the exclusion zone and there is no potential for exposure to site contaminants, subcontractor personnel may be exempt from the training and medical surveillance requirements with the exception of Section 8.2. Examples of

subcontractors who may qualify as exempt from training and medical surveillance requirements may include surveyors who perform surveying activities in site perimeter areas or areas were there is no potential for exposure to site contaminants and support or restoration services. **Use of this Subcontractor Exception is strictly limited to the authority of the CLEAN Health and Safety Manager.**

FIGURE 8-1
SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing field investigation activities at NAS Pensacola, Pensacola, Florida and that I have received site-specific training that included the elements presented below:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Incipient response procedures
- Review of the contents of relevant Material Safety Data Sheets
- Review of the use of Safe Work Permits

I have been given the opportunity to ask questions and that my questions have been answered to my satisfaction and that the date of my training and my medical surveillance requirements indicated below are accurate.

Name (Printed and Signature)	Site-Specific Training Date	40-Hour Training (Date)	8-Hour Refresher Training (Date)	8-Hour Supervisory Training (Date)	Medical Exam

Instructor(s): _____

_____

9.0 SPILL PREVENTION AND CONTAINMENT PROGRAM

9.1 SCOPE AND APPLICATION

This program applies to the single or aggregate accumulation of bulk storage materials (over 55-gallons). As the classification of certain materials such as IDW is unknown, these materials will be treated as hazardous, pending laboratory certification to the contrary. The types of materials for which this program will apply are as follows:

- Investigative Derived Wastes (IDW) such as decontamination fluids, soil cuttings, and purge and well development waters
- Resource Storage – Limited fuel and lubricant storage

The spill containment and control will be engaged any time there is a release of the above-identified materials from a containment system or vessel. This spill containment program will be engaged in order to minimize associated hazards.

9.2 POTENTIAL SPILL AREAS

Potential spill areas will be periodically monitored in an ongoing attempt to prevent and control further potential contamination of the environment. Currently, limited areas are vulnerable to this hazard including:

- Resource deployment
- Waste transfer
- Central staging

It is anticipated that the IDW generated as a result of this scope of work will be containerized, labeled, and staged to await further analyses. The results of these analyses will determine the method of disposal.

9.3 CONTAINMENT AREAS

In order to facilitate leak and spill inspection and response, and to minimize potential hazards which may impact the integrity of the storage containers, the staging area for these substances will be structured as follows:

IDW

- 55 Gallon Drums (United Nations 1A2 configurations) – 4 Drums to a Pallet; labels and the retaining ring bolt and nut on the outside of each drum to facilitate easy access; Minimum 4-feet between each row of pallets. The decision to construct a bermed and lined area will be the decision of project management.

Regardless of container types selected, the staging area will be identified as a Satellite Storage Area with proper signage, points of contact in the event of an emergency, alternate contacts, and identification of stored material (i.e., Purge or decontamination waters, soil cuttings, etc.).

An Inventory Log will be maintained by the FOL regarding types of IDW and volumes generated. An updated Inventory List will be provided by the FOL to the designated Emergency Response Agency or Facility Contact during days off and between shifts or phases of operations.

Flammable/POL Storage

Flammable Storage [i.e., fuels, decontamination solvents (Isopropanol)] and Petroleum/oil/lubricants (POL) will require proper dispensing containers and necessary storage for cumulative volumes in excess of 25 gallons. Storage and dispensing will comply with the following requirements:

- All fuels dispensed from portable containers, will utilize safety cans.
- Portable hand held storage containers will be labeled per Hazard Communication requirements.
- Dispensing locations will be supported by a Fire Extinguisher positioned no closer than 50 feet from the storage tank, properly mounted and identified.
- The storage location will be well marked with proper signage, protective bumper poles and will have straight through access/egress for vehicles.

9.4 MATERIALS HANDLING

To minimize the hazards associated with moving drums and containers (i.e., lifting, pinch and compression points) material handling will be supported in the following manner:

- A drum cart with pneumatic tires will be required, if drums are to be moved at the IDW storage area. This cart will be used to relocate drums within the staging and satellite storage location.

Generally, collected IDW (soil and water) will be transported to the IDW Storage location in portable containers and dump in the drums at the storage location.

Other means of material handling will be evaluated by the SHSO based on their ability to minimize or eliminate material handling hazards.

9.5 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, a periodic walk-around by the personnel staging or disposing of drums or in the Resource Deployment area will be conducted during working hours to visually determine that storage vessels are not leaking. If a leak is detected, the FOL will be notified and the Spill Containment/Control Response Plan as specified in Section 9.8 will be engaged. Inspections will be documented in the project logbook.

9.6 PERSONNEL TRAINING AND SPILL PREVENTION

Personnel will be instructed in the procedures for incipient spill prevention, containment, and collection of hazardous materials in the site-specific training. The FOL and/or the SHSO will serve as the Spill Response Coordinators for this operation, should the need arise. The FOL shall identify two members (at least two) of the project team as the Incidental Spill Response Team. Should an incidental spill occur these individuals will engage incident response measures. It shall be the responsibility of these individuals to insure they have the supplies and equipment specified in Section 9.7 to support this function. Insufficient supplies or resources should be reported to the FOL.

9.7 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the minimum equipment that will always be maintained at the staging areas the purpose of supporting this Spill Containment/Control Plan.

- Sand, clean fill, vermiculite, or other non combustible absorbent (Oil-dry)
- Extra Drums (55-gallon U.N. 1A2) should the need to transfer material from leaking containers arise.
- Shovels, rakes, and brooms
- Container labels
- Personal Protective Equipment
    - Nitrile outer gloves
    - Splash Shield
    - Impermeable over-boots
    - Rain suit

9.8 SPILL CONTAINMENT/CONTROL RESPONSE PLAN

This section describes the procedures the Tetra Tech NUS field personnel will employ upon the detection of a spill or leak.

- Notify the SHSO or FOL immediately upon detection of a leak or spill.

- Employ the personal protective equipment stored at the staging area. Initiate incidental spill response measures. Take immediate actions to stop the leak or spill by plugging or patching the container or raising the leak to the highest point in the vessel. Spread the absorbent material in the area of the spill, covering it completely.

- Transfer the material to a new vessel; collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options.

- Re-containerize spills, including 2-inch of top cover (if over soils) impacted by the spill. Await test results for treatment or disposal options.

- If the spill cannot be controlled or contained, initiate emergency alerting procedures for that area to remove non-essential personnel.

It is not anticipated that a spill will occur that the field crew cannot handle. Should this occur, notification of the appropriate Emergency Response agencies will be carried out by the FOL or SHSO in accordance with the procedures specified in Section 2.0 of this HASP.

10.0 SITE OPERATIONS AND CONTROL

Site operations and control will be facilitated through the use of established work zones and security and control of those zones. These activities will minimize the impact and spread of contaminants brought to the surface through subsurface investigative methods as well as protect personnel and visitors within these zones during ongoing operations.

10.1 WORK ZONES

Tetra Tech NUS will delineate and use work zones in conjunction with decontamination procedures to prevent the spread of contaminants to other areas of the site. A three-zone approach will be used for work at this site; an Exclusion Zone, a Contamination Reduction Zone, and a Support Zone. These will be used to control access to the work areas, restricting the general public, avoiding potentials to spread any contaminants, and to protect individuals who are not cleared to enter by way of training and/or medical surveillance qualifications.

Exclusion Zone

An Exclusion Zone will be established at each sampling point/location. The purpose of the exclusion zone is to define an area where a more rigorous protocol for workers within what is determined to be an impact area. The impact area is that area which could be adversely impacted by either chemical or physical hazards. Exclusion zone size and dimensions will vary based on activities. Impact areas dimensions will be influenced by the following considerations:

- Physical and topographical features of the site
- Weather conditions
- Field and analytical measurements of air and environmental contaminants
- Air dispersion calculations
- Potential for explosion and dispersion
- Physical, chemical and toxicological properties of the contaminants being investigated
- Tasks to be conducted
- Decontamination procedures
- Potential for exposure

As conditions change the dimensions of the exclusion zone will change. However, the following dimensions represent a starting point from which the exclusion zones will be expanded:

- DPT - Soil Boring. The exclusion zone for this activity will be set at the height of the mast, plus five feet surrounding the point of operation or 25-feet, whichever is greater. This distance will also apply when surface and subsurface soil sampling from behind these type rigs.

- Monitoring well development, groundwater sampling, and water level measurements. The exclusion zone for this activity will be set at 10-feet surrounding the well head and discharge collection container.

- Decontamination operation. The exclusion zone for this activity will be set at 5 feet surrounding the gross contamination wash and rinse as well as 5-feet surrounding the heavy equipment decontamination area.

- Investigative Derived Waste (IDW) area will be constructed and barricaded. Only authorized personnel will be allowed access.

Exclusion zones shall remain marked until the SHSO has evaluated the restoration effort and has authorized changing the zone status.

Exclusion zones will be marked using barrier tape, traffic cones and/or drive poles. Signs will be posted to inform and direct site personnel and site visitors.

Contamination Reduction Zone

The contamination reduction zone will be immediately adjacent to the DPT operation. In order to move from the exclusion zone to a separate location the following activities will be used:

- As samplers move from location to location during sampling activities, dedicated sampling devices and PPE will be washed of gross contamination, removed, separated, and bagged. Personnel will use hygienic wipes, such as Handy Wipes, as necessary for personnel decontamination until they can access an area where they can wash their face and hands. This is critical prior to breaks and lunch when contamination can be transferred to the mouth through hand to mouth contact.

- Potentially contaminated tooling along will be decontaminated as defined in Section 5.5.1.

Support Zone

The Support Zone will consist of a vehicles, field trailers (as applicable), storage, lay-down areas, or some other uncontaminated, controlled point. The Support Zone for this project will include a staging

area where site vehicles can be parked, equipment will be unloaded, and where food and drink containers will be maintained. The support zones will be established in clean areas of the site.

10.2 SAFE WORK PERMITS

Exclusion Zone work conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task by task basis. An example of the Safe Work Permit is included in Figure 10-1. The daily meetings conducted by the FOL/SHSO will further support these work permits. The use of these permits will ensure that site-specific considerations and changing conditions are incorporated into the planning effort. Safe Work Permits will require the signatures of either the FOL or the SHSO. Personnel engaged in on-site activities must be made aware of the elements indicating levels of protection and precautionary measures to be used.

The use of these permits will establish and provide for reviewing protective measures and hazards associated with each operation. This HASP will be used as the primary reference for selecting levels of protection and control measures. The Safe Work Permit will take precedence over the HASP when more conservative measures are required based on specific site conditions.

Upon completion of the work for which the Safe Work Permit was assigned, the Safe Work Permit will be turned into the FOL or the SHSO. Concerns, complaints, and suggestions may be made on the reverse of the Safe Work Permit for consideration by the FOL and/or the SHSO. Permits turned in with suggestions, difficulties, or complaints will be forwarded to the PHSO for review.

The Safe Work Permit and the HASP will serve as the primary reference for work place evaluations and audits conducted to determine if the task is being conducted under the direction conveyed by the HASP and the Safe Work Permit.

10.3 SITE MAP

Once the areas of contamination, access routes, topography, and dispersion routes are determined, a site map will be generated and adjusted as site conditions change. This map will be posted to illustrate up-to-date information of contaminants and adjustment of zones and access points. This map will be posted at the field support trailer.

10.4 BUDDY SYSTEM

Personnel engaged in on-site activities will practice the "buddy system" to ensure the safety of the personnel involved in this operation.

FIGURE 10-1
SAFE WORK PERMIT

Permit No. _____ Date: _____ Time: From _____ to ____

SECTION I: General Job Scope

I. **Work limited to the following (description, area, equipment used):** _____

II. **Primary Hazards:** _____

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. **Protective equipment required**
Level D ☐ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☐

Modifications/Exceptions: _____

VI. **Chemicals of Concern** | **Hazard Monitoring** | **Action Level(s)** | **Response Measures**

Primary Route of Exposure/Hazard _____

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☐ Yes ☐ No	Safety belt/harness	☐ Yes ☐ No
Chemical/splash goggles	☐ Yes ☐ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☐ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☐ No	Gloves (Type – Nitrile)	☐ Yes ☐ No
Impermeable apron	☐ Yes ☐ No	Work/rest regimen	☐ Yes ☐ No
Steel toe Work shoes or boots	☐ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☐ No
High Visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☐ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: _____

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** _____

Permit Issued by: _____ Permit Accepted by: _____

10.5 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

Tetra Tech NUS and subcontractor personnel will provide MSDSs for chemicals brought on-site. The contents of these documents will be reviewed by the SHSO to insure applicable categories have been addressed. Personnel are required to review the contents of the MSDS of the chemical substances prior to any actual use or application or the substances on-site if they are unfamiliar with the hazards and/or recommended control measures. The MSDSs will be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request. The SHSO will be responsible for implementing a site-specific Hazard Communication Program (See Section 5.0 of the TtNUS Health and Safety Guidance Manual). This includes collection of MSDSs, creation and maintenance of an accurate Chemical Inventory Listing, addressing container labeling and personnel training issues, and other aspects of Hazard Communication.

10.6 COMMUNICATION

It is anticipated that site personnel will be working in close proximity during proposed field activities. In the event that site personnel are in isolated areas or are separated by significant distances, a supported means of communication between field crews will be utilized such as Two-way radios or cellular phones. Two-way radio communication devices, if needed, will be used only with NAS Pensacola approval.

External communications will be accomplished utilizing telephones at predetermined and approved locations or through cellular phones. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of site activities, the FOL will determine and arrange for telephone communications, if it is determined a cellular means will not be used. Cellular communications will be tested to insure adequate coverage from all areas of operation. If not provisions for external communication will be made prior to the commencement of site activities.

10.7 SITE VISITORS

Potential site visitors that may be encountered during the performance of the field work could include the following:

- Personnel invited to observe or participate in operations by Tetra Tech NUS.
- Regulatory personnel (i.e., DOD, FDEP, EPA, OSHA, etc.)
- Southeast Navy personnel
- Other authorized visitors

Non-DOD personnel working on this project are required to gain initial access to the base by coordinating with the TtNUS TOM or designee and following established base access procedures.

Once access to the base is obtained, personnel who require access to Tetra Tech NUS work sites (areas of ongoing operations) will be required to obtain permission from the FOL and the Base Contact. Upon gaining access to the work site, site visitors wishing to observe operations in progress will be required to meet the minimum requirements as stipulated below.

- Site visitors will be routed to the FOL, who will sign them into the field logbook. Information to be recorded in the logbook will include the individuals name (proper identification required), who they represent, and the purpose for the visit. The FOL is responsible for ensuring that site visitors are always escorted while on site.

- Site visitors will be required to produce the necessary information supporting clearance on to the site. This includes information attesting to applicable training (40-hours of HAZWOPER training required for Southeast Navy Personnel), and medical surveillance as stipulated in Section 8.3, of this document. In addition, to enter the sites operational zones during planned activities, visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP.

Once the site visitors have completed the above items they will be permitted to enter the site and applicable operational areas. Visitors are required to observe the protective equipment and site restrictions in effect at the work areas visited. Any visitors not meeting the requirements as stipulated in this plan for site clearance will not be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause on-site activities to be terminated until that visitor can be removed. Removal of unauthorized visitors will be accomplished with support form the Base Contact, if necessary. At a minimum, the Base Contact will be notified of any unauthorized visitors.

10.8 SITE SECURITY

As this activity will take place at a Navy facility, the first line of security will be provided by the base gate restricting the general public. The second line of security will take place at the work site referring interested parties to the FOL and Base Contact.

Security at the work areas will be accomplished using field personnel. This is a multiple person operation, involving multiple operational zones. Tetra Tech NUS personnel will retain complete control over active operational zones.

The Base Contact will serve as the focal point for base personnel and interested parties and will serve as the primary enforcement contact.

11.0 CONFINED SPACE ENTRY

It is not anticipated, under the proposed scope of work, that confined space and permit-required confined space activities will be conducted. **Therefore, personnel under the provisions of this HASP are not allowed, under any circumstances, to enter confined spaces**.

A confined space means a space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work; and

- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and

- Is not designed for continuous employee occupancy.

A Permit-Required Confined Space is a confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere.

- Contains a material that has the potential to engulf an entrant.

- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.

- Contains any other recognized, serious, safety or health hazard.

For further information on confined space, consult the Health and Safety Guidance Manual or call the PHSO. If confined space operations are to be performed as part of the scope of work, detailed procedures and training requirements will have to be addressed, and the HSM will have to be notified.

12.0 MATERIALS AND DOCUMENTATION

The TtNUS FOL shall ensure the following materials/documents are taken to the project site and used when required.

- A complete copy of this HASP
- Health and Safety Guidance Manual
- Incident Reports
- Medical Data Sheets
- Material Safety Data Sheets for chemicals brought on site, including decontamination solutions, fuels, sample preservatives, calibration gases, etc.
- A full-size OSHA Job Safety and Health Poster (posted in the site trailers)
- Training/Medical Surveillance Documentation Form (Blank)
- Emergency Reference Information (Section 2.0, extra copy for posting)

12.1 MATERIALS TO BE POSTED OR MAINTAINED AT THE SITE

The following documentation is to be posted or maintained at the site for quick reference purposes. In situations where posting these documents is not feasible, (such as no office trailer), these documents should be separated and immediately accessible.

Chemical Inventory Listing (posted) - This list represents chemicals brought on-site, including decontamination solutions, sample preservations, fuel, etc.. This list should be posted in a central area.

MSDSs (maintained) - The MSDSs should also be in a central area accessible to site personnel. These documents should match the listings on the chemical inventory list for substances used on-site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

The OSHA Job Safety & Health Protection Poster (posted) - this poster, as directed by 29 CFR 1903.2 (a)(1), should be conspicuously posted in places where notices to employees are normally posted. Each FOL shall ensure that this poster is not defaced, altered, or covered by other material.

Site Clearance (maintained) - This list is found within the training section of the HASP (See Figure 8-2). This list identifies site personnel, dates of training (including site-specific training), and medical surveillance. The lists indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.

Emergency Phone Numbers and Directions to the Hospital(s) (posted) - This list of numbers and directions will be maintained at the phone communications points and in each site vehicle.

Medical Data Sheets/Cards (maintained) - Medical Data Sheets will be filled out by on-site personnel and filed in a central location. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility. A copy of this sheet or a wallet card will be given to personnel to be carried on their person.

Hearing Conservation Standard (29 CFR 1910.95) (posted) - this standard will be posted anytime hearing protection or other noise abatement procedures are employed.

Personnel Monitoring (maintained) - The results generated through personnel sampling (levels of airborne toxins, noise levels, etc.) will be posted to inform individuals of the results of that effort.

Placards and Labels (maintained) - Where chemical inventories have been separated because of quantities and incompatibilities, these areas will be conspicuously marked using Department of Transportation (DOT) placards and acceptable (Hazard Communication 29 CFR 1910.1200(f)) labels.

The purpose of maintaining or posting this information, as stated above, is to allow site personnel quick access. Variations concerning location and methods of presentation are acceptable, providing the objection is accomplished.

13.0 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CERCLA	Comprehensive Environmental Response Compensation, and Liability Act
CFR	Code of Federal Regulations
CNS	Central Nervous System
CRZ	Contamination Reduction Zone
CTO	Contract Task Order
DPT	Direct-Push Technology
FID	Flame Ionization Detector
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health and Safety Manager
IDW	Investigation-derived Waste
MSDS	Material Safety Data Sheet
N/A	Not Available
NAS	Naval Air Station
NIOSH	National Institute Occupational Safety and Health
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PHSO	Project Health and Safety Officer
PPE	Personal Protective Equipment
SOPs	Standard Operating Procedures
SHSO	Site Health and Safety Officer
STEL	Short Term Exposure Limit
TOM	Task Order Manager
TtNUS	Tetra Tech NUS, Inc.
TWA	Time Weighted Average
VOCs	Volatile Organic Compounds

ATTACHMENT I

INJURY/ILLNESS PROCEDURE AND REPORT FORM

TETRA TECH NUS, INC.

INJURY/ILLNESS PROCEDURE
WORKER'S COMPENSATION PROGRAM

WHAT YOU SHOULD DO IF YOU ARE INJURED OR DEVELOP AN ILLNESS AS A RESULT OF YOUR EMPLOYMENT:

- Stop work as needed to ensure no further harm is done.
- If injury is minor, obtain appropriate first aid treatment.
- If injury or illness is severe or life threatening, obtain professional medical treatment at the nearest hospital emergency room. Check with your office location or project health and safety plan for specific instructions.
- If incident involves an injury, illness, or chemical exposure on a project work site, follow instructions in the Health & Safety Plan.
- Immediately report any injury or illness to your supervisor or office manager. In addition, you must contact your Human Resources representative, Marilyn Duffy at (412) 921-8475, and the Corporate Health and Safety Manager, Matt Soltis at (412) 921-8912 within 24 hours of the injury. You will be required to complete an Injury/Illness Report. You may also be required to participate in a more detailed investigation with the Health Sciences Department.
- In the event of a serious near-miss incident, a "Serious Near Miss Report" (Form AR-2, available online at https://go2.tetratech.com under "Departments", "Health and Safety", "Accident Reporting Procedures", hyperlink for "Serious Near Miss Report") must be completed and faxed to the Corporate Health and Safety Manager within 48 hours.
- If further medical treatment is needed, our insurance carrier, ACE, will provide information on the authorized providers customized to the location of the injured employee. You can find this information by accessing the website of ACE's claims handler, ESIS, at : **www.esis.com**. These providers are to be used for treatment of Worker's Compensation injuries subject to the laws of the state in which you work.

ADDITIONAL QUESTIONS REGARDING WORKER'S COMPENSATION:

Contact your local Human Resources representative (Marilyn Duffy), Corporate Health and Safety Manager (Matt Soltis), or Corporate Administration in Pasadena, California, at (626) 351-4664.

Worker's compensation is a state-mandated program that provides medical and disability benefits to employees who become disabled due to job related injury or illness. Tetra Tech, Inc. and its subsidiaries pay premiums on behalf of their employees. This program is based on a no-fault system, and benefits are provided for covered events as an exclusive remedy to the injured employee regardless of fault. The types of injuries or illnesses covered and the amount of

benefits paid are regulated by the state worker's compensation boards and vary from state to state. Corporate Administration in Pasadena is responsible for administering the Company's worker's compensation program. The following is a general explanation of worker's compensation provided in the event that you become injured or develop an illness as a result of your employment with Tetra Tech or any of its subsidiaries. Please be aware that the term used for worker's compensation varies from state to state.

WHO IS COVERED:

All employees of Tetra Tech, whether they are on a full-time, part-time or temporary status, working in an office or in the field, are entitled to worker's compensation benefits from the first day of work. All employees must follow the above injury/illness reporting procedures. If you are working out-of-state and away from your home office, you are still eligible for worker's compensation benefits.

Consultants, independent contractors, and employees of subcontractors and employees from temporary employment agencies are not covered by Tetra Tech's Worker's Compensation plan.

WHAT IS COVERED:

If you are injured or develop an illness caused by your employment, worker's compensation benefits are available to you subject to the laws of the state you work in. Injuries do not have to be serious; even injuries treated by first aid practices are covered and must be reported.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT

To: _____
Subsidiary Health and Safety Representative

cc: _____
Workers Compensation Administrator

Project name: _____

Project number: _____

Prepared by: _____

Position: _____

Office: _____

Telephone number: _____

Fax number: _____

Information Regarding Injured or Ill Employee

Name: _____ Office: _____

Home address: _____ Gender: M ☐ F ☐ No. of dependents: _____

_____ Marital status: _____

Home telephone number: _____ Date of birth: _____

Occupation (regular job title): _____ Social security number: _____

Department: _____

Date of Accident: _____ **Time of Accident:** _____ a.m. ☐ p.m. ☐

Time Employee Began Work: _____ ☐ Check if time cannot be determined

Location of Incident

Street address: _____

City, state, and zip code: _____

County: _____

Was place of accident or exposure on employer's premises? Yes ☐ No ☐

Information About the Incident

What was the employee doing just before the incident occurred? Describe the activity as well as the tools, equipment, or material the employee was using. Be specific. Examples: "Climbing a ladder while carrying roofing materials"; "Spraying chlorine from hand sprayer"; "Daily computer key-entry"

What Happened? Describe how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time"

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Information About the Incident (Continued)

What was the injury or illness? Describe the part(s) of the body affected and how it was affected. Be more specific than "hurt," "pain," or "sore." Examples "Strained back"; "Chemical burn, right hand"; "Carpal tunnel syndrome, left wrist"

Describe the Object or Substance that Directly Harmed the Employee: Examples: "Concrete floor"; "Chlorine"; "Radial arm saw." If this question does not apply to the incident, write "Not applicable."

Did the employee die? Yes ☐ No ☐ Date of death: _____

Was employee performing regular job duties? Yes ☐ No ☐

Was safety equipment provided? Yes ☐ No ☐ Was safety equipment used? Yes ☐ No ☐

Note: Attach any police reports or related diagrams to this report.

Witness (Attach additional sheets for other witnesses.)

Name: _____

Company: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Medical Treatment Required? ☐ Yes ☐ No ☐ First aid only

Name of physician or health care professional: _____

If treatment was provided away from the work site, provide the information below.

Facility name: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Was the employee treated in an emergency room? ☐ Yes ☐ No

Was the employee hospitalized over night as an in-patient? ☐ Yes ☐ No

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Corrective Action(s) Taken by Unit Reporting the Accident:

Corrective Action Still to be Taken (by whom and when):

Name of Tetra Tech employee the injury or illness was first reported to: _____

Date of Report: _____ **Time of Report:** _____

I have reviewed this investigation report and agree, to the best of my recollection, with its contents.

Printed Name of Injured Employee	Telephone Number
Signature of Injured Employee	Date

The signatures provided below indicate that appropriate personnel have been notified of the incident.

Title	Printed Name	Signature	Telephone Number	Date
Office Manager				
Project Manager				
Site Safety Coordinator or Office Health and Safety Representative				

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

To Be Completed by the Subsidiary Health and Safety Representative

Classification of Incident:

☐ Injury ☐ Illness

Result of Incident:

☐ First aid only

☐ Days away from work

☐ Remained at work but incident resulted in job transfer or work restriction

☐ Incident involved days away and job transfer or work restriction

☐ Medical treatment only

No. of days away from work _____

Date employee left work _____

Date employee returned to work _____

No. of days placed on restriction or job transfer: _____

OSHA Recordable Case Number _____

To Be Completed by Human Resources

Social security number: _____

Date of hire: _____ Hire date for current job: _____

Wage information: $ _____ per ☐ Hour ☐ Day ☐ Week ☐ Month

Position at time of hire: _____

Current position: _____ Shift hours: _____

State in which employee was hired: _____

Status: ☐ Full-time ☐ Part-time Hours per week: _____ Days per week: _____

Temporary job end date: _____

To Be Completed during Report to Workers Compensation Carrier

Date reported: _____ Reported by: _____

Confirmation number: _____

Name of contact: _____

Field office of claims adjuster: _____

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

ATTACHMENT II

STANDARD OPERATING PROCEDURE
FOR
UTILITY LOCATING AND EXCAVATION CLEARANCE

TETRA TECH NUS, INC.	STANDARD OPERATING PROCEDURES	Number HS-1.0	Page 1 of 15
		Effective Date 12/03	Revision 2
		Applicability Tetra Tech NUS, Inc.	
		Prepared Health & Safety	
Subject UTILITY LOCATING AND EXCAVATION CLEARANCE		Approved D. Senovich	

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1.0 PURPOSE

Utilities such as electric service lines, natural or propane gas lines, water and sewage lines, telecommunications, and steam lines are very often in the immediate vicinity of work locations. Contact with underground or overhead utilities can have serious consequences including employee injury/fatality, property and equipment damage, substantial financial impacts, and loss of utility service to users.

The purpose of this procedure is to provide minimum requirements and technical guidelines regarding the appropriate procedures to be followed when performing subsurface and overhead utility locating services. It is the policy of Tetra Tech NUS, Inc. (TtNUS) to provide a safe and healthful work environment for the protection of our employees. The purpose of this Standard Operating Procedure (SOP) is to aid in achieving the objectives of this policy, to present the acceptable procedures pertaining to utility locating and excavation clearance activities, and to present requirements and restrictions relevant to these types of activities. This SOP must be reviewed by any employee potentially involved with underground or overhead utility locating and avoidance activities.

2.0 SCOPE

This procedure applies to all TtNUS field activities where there may be potential contact with underground or overhead utilities. This procedure provides a description of the principles of operation, instrumentation, applicability, and implementability of typical methods used to determine the presence and avoidance of contact with utility services. This procedure is intended to assist with work planning and scheduling, resource planning, field implementation, and subcontractor procurement. Utility locating and excavation clearance requires site-specific information prior to the initiation of any such activities on a specific project. This SOP is not intended to provide a detailed description of methodology and instrument operation. Specialized expertise during both planning and execution of several of the methods presented may also be required.

3.0 GLOSSARY

Electromagnetic Induction (EMI) Survey - A geophysical exploration method whereby electromagnetic fields are induced in the ground and the resultant secondary electromagnetic fields are detected as a measure of ground conductivity.

Magnetometer – A device used for precise and sensitive measurements of magnetic fields.

Magnetic Survey – A geophysical survey method that depends on detection of magnetic anomalies caused by the presence of buried ferromagnetic objects.

Metal Detection – A geophysical survey method that is based on electromagnetic coupling caused by underground conductive objects.

Vertical Gradiometer – A magnetometer equipped with two sensors that are vertically separated by a fixed distance. It is best suited to map near surface features and is less susceptible to deep geologic features.

Ground Penetrating Radar – Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture.

4.0 RESPONSIBILITIES

Project Manager (PM)/Task Order Manager (TOM) - Responsible for ensuring that all field activities are conducted in accordance with this procedure.

Site Manager (SM)/Field Operations Leader (FOL) - Responsible for the onsite verification that all field activities are performed in compliance with approved SOPs or as otherwise directed by the approved project plan(s).

Site Health & Safety Officer (SHSO) – Responsible to provide technical assistance and verify full compliance with this SOP. The SHSO is also responsible for reporting any deficiencies to the Corporate Health and Safety Manager (HSM) and to the PM/TOM.

Health & Safety Manager (HSM) – Responsible for preparing, implementing, and modifying corporate health and safety policy and this SOP.

Site Personnel – Responsible for performing their work activities in accordance with this SOP and the TtNUS Health and Safety Policy.

5.0 PROCEDURES

This procedure addresses the requirements and technical procedures that must be performed to minimize the potential for contact with underground and overhead utility services. These procedures are addressed individually from a buried and overhead standpoint.

5.1 Buried Utilities

Buried utilities present a heightened concern because their location is not typically obvious by visual observation, and it is common that their presence and/or location is unknown or incorrectly known on client properties. This procedure must be followed prior to beginning any subsurface probing or excavation that might potentially be in the vicinity of underground utility services. In addition, the Utility Clearance Form (Attachment 3) must be completed for every location or cluster of locations where intrusive activities will occur.

Where the positive identification and de-energizing of underground utilities cannot be obtained and confirmed using the following steps, the PM/TOM is responsible for arranging for the procurement of a qualified, experienced, utility locating subcontractor who will accomplish the utility location and demarcation duties specified herein.

1. A comprehensive review must be made of any available property maps, blue lines, or as-builts prior to site activities. Interviews with local personnel familiar with the area should be performed to provide additional information concerning the location of potential underground utilities. Information regarding utility locations shall be added to project maps upon completion of this exercise.

2., A visual site inspection must be performed to compare the site plan information to actual field conditions. Any findings must be documented and the site plan/maps revised. The area(s) of proposed excavation or other subsurface activities must be marked at the site in white paint or pin flags to identify those locations of the proposed intrusive activities. The site inspection should focus on locating surface indications of potential underground utilities. Items of interest include the presence of nearby area lights, telephone service, drainage grates, fire hydrants, electrical service vaults/panels, asphalt/concrete scares and patches, and topographical depressions. Note the location of any emergency shut off switches. Any additional information regarding utility

locations shall be added to project maps upon completion of this exercise and returned to the PM/TOM.

3. If the planned work is to be conducted on private property (e.g., military installations, manufacturing facilities, etc.) the FOL must identify and contact appropriate facility personnel (e.g., public works or facility engineering) before any intrusive work begins to inquire about (and comply with) property owner requirements. It is important to note that private property owners may require several days to several weeks advance notice prior to locating utilities.

4. If the work location is on public property, the state agency that performs utility clearances must be notified (see Attachment 1). State "one-call" services must be notified prior to commencing fieldwork per their requirements. Most one-call services require, by law, 48- to 72-hour advance notice prior to beginning any excavation. Such services typically assign a "ticket" number to the particular site. This ticket number must be recorded for future reference and is valid for a specific period of time, but may be extended by contacting the service again. The utility service will notify utility representatives who then mark their respective lines within the specified time frame. It should be noted that most military installations own their own utilities but may lease service and maintenance from area providers. Given this situation, "one call" systems may still be required to provide location services on military installations.

5. Utilities must be identified and their locations plainly marked using pin flags, spray paint, or other accepted means. The location of all utilities must be noted on a field sketch for future inclusion on project maps. Utility locations are to be identified using the following industry-standard color code scheme, unless the property owner or utility locator service uses a different color code:

white	excavation/subsurface investigation location
red	electrical
yellow	gas, oil, steam
orange	telephone, communications
blue	water, irrigation, slurry
green	sewer, drain

6. Where utility locations are not confirmed with a high degree of confidence through drawings, schematics, location services, etc., the work area must be thoroughly investigated prior to beginning the excavation. In these situations, utilities must be identified using safe and effective methods such as passive and intrusive surveys, or the use of non-conductive hand tools. Also, in situations where such hand tools are used, they should always be used in conjunction with suitable detection equipment, such as the items described in Section 6.0 of this SOP. Each method has advantages and disadvantages including complexity, applicability, and price. It also should be noted that in some states, initial excavation is required by hand to a specified depth.

7. At each location where trenching or excavating will occur using a backhoe or other heavy equipment, and where utility identifications and locations cannot be confirmed prior to groundbreaking, the soil must be probed using a device such as a tile probe which is made of non-conductive material such as fiberglass. If these efforts are not successful in clearing the excavation area of suspect utilities, hand shoveling must be performed for the perimeter of the intended excavation.

8. All utilities uncovered or undermined during excavation must be structurally supported to prevent potential damage. Unless necessary as an emergency corrective measure, TtNUS shall not make any repairs or modifications to existing utility lines without prior permission of the utility owner, property owner, and Corporate HSM. All repairs require that the line be locked-out/tagged-out prior to work.

5.2 Overhead Power Lines

If it is necessary to work within the minimum clearance distance of an overhead power line, the overhead line must be de-energized and grounded, or re-routed by the utility company or a registered electrician. If protective measures such as guarding, isolating, or insulating are provided, these precautions must be adequate to prevent employees from contacting such lines directly with any part of their body or indirectly though conductive materials, tools, or equipment.

The following table provides the required minimum clearances for working in proximity to overhead power lines.

Nominal Voltage	Minimum Clearance
0 -50 kV	10 feet, or one mast length; whichever is greater
50+ kV	10 feet plus 4 inches for every 10 kV over 50 kV or 1.5 mast lengths; whichever is greater

6.0 UNDERGROUND LOCATING TECHNIQUES

A variety of supplemental utility locating approaches are available and can be applied when additional assurance is needed. The selection of the appropriate method(s) to employ is site-specific and should be tailored to the anticipated conditions, site and project constraints, and personnel capabilities.

6.1 Geophysical Methods

Geophysical methods include electromagnetic induction, magnetics, and ground penetrating radar. Additional details concerning the design and implementation of electromagnetic induction, magnetics, and ground penetrating radar surveys can be found in one or more of the TtNUS SOPs included in the References (Section 8.0).

Electromagnetic Induction

Electromagnetic Induction (EMI) line locators operate either by locating a background signal or by locating a signal introduced into the utility line using a transmitter. A utility line acts like a radio antenna, producing electrons, which can be picked up with a radiofrequency receiver. Electrical current carrying conductors have a 60HZ signal associated with them. This signal occurs in all power lines regardless of voltage. Utilities in close proximity to power lines or used as grounds may also have a 60HZ signal, which can be picked up with an EM receiver. A typical example of this type of geophysical equipment is an EM-61.

EMI locators specifically designed for utility locating use a special signal that is either indirectly induced onto a utility line by placing the transmitter above the line or directly induced using an induction clamp. The clamp induces a signal on the specific utility and is the preferred method of tracing since there is little chance of the resulting signals being interfered with. A good example of this type of equipment is the Schonstedt® MAC-51B locator. The MAC-51B performs inductively traced surveys, simple magnetic locating, and traced nonmetallic surveys.

When access can be gained inside a conduit to be traced, a flexible insulated trace wire can be used. This is very useful for non-metallic conduits but is limited by the availability of gaining access inside the pipe.

Magnetics

Magnetic locators operate by detecting the relative amounts of buried ferrous metal. They are incapable of locating or identifying nonferrous utility lines but can be very useful for locating underground storage tanks (UST's), steel utility lines, and buried electrical lines. A typical example of this type of equipment is the Schonstedt® GA-52Cx locator. The GA-52Cx is capable of locating 4-inch steel pipe up to 8 feet deep.

Non-ferrous lines are often located by using a typical plumbing tool (snake) fed through the line. A signal is then introduced to the snake that is then traced.

Ground Penetrating Radar

Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture. In general, an object which is harder than the surrounding soil will reflect a stronger signal. Utilities, tunnels, UST's, and footings will reflect a stronger signal than the surrounding soil. Although this surface detection method may determine the location of a utility, this method does not specifically identify utilities (i.e., water vs. gas, electrical vs. telephone); hence, verification may be necessary using other methods. This method is somewhat limited when used in areas with clay soil types or with a high water table.

6.2 Passive Detection Surveys

Acoustic Surveys

Acoustic location methods are generally most applicable to waterlines or gas lines. A highly sensitive Acoustic Receiver listens for background sounds of water flowing (at joints, leaks, etc.) or to sounds introduced into the water main using a transducer. Acoustics may also be applicable to determine the location of plastic gas lines.

Thermal Imaging

Thermal (i.e., infrared) imaging is a passive method for detecting the heat emitted by an object. Electronics in the infrared camera convert subtle heat differentials into a visual image on the viewfinder or a monitor. The operator does not look for an exact temperature; rather they look for heat anomalies (either elevated or suppressed temperatures) characteristic of a potential utility line.

The thermal fingerprint of underground utilities results from differences in temperature between the atmosphere and the fluid present in a pipe or the heat generated by electrical resistance. In addition, infrared scanners may be capable of detecting differences in the compaction, temperature and moisture content of underground utility trenches. High-performance thermal imagery can detect temperature differences to hundredths of a degree.

6.3 Intrusive Detection Surveys

Vacuum Excavation

Vacuum excavation is used to physically expose utility services. The process involves removing the surface material over approximately a 1' x 1' area at the site location. The air-vacuum process proceeds with the simultaneous action of compressed air-jets to loosen soil and vacuum extraction of the resulting

debris. This process ensures the integrity of the utility line during the excavation process, as no hammers, blades, or heavy mechanical equipment comes into contact with the utility line, eliminating the risk of damage to utilities. The process continues until the utility is uncovered. Vacuum excavation can be used at the proposed site location to excavate below the "utility window" which is usually 8 feet.

Hand Excavation

When the identification and location of underground utilities cannot be positively confirmed through document reviews and/or other methods, borings and excavations may be cleared via the use of non-conductive hand tools. This should always be done in conjunction with the use of detection equipment. This would be required for all locations where there is a potential to impact buried utilities. The minimum hand-excavation depth that must be reached is to be determined considering the geographical location of the work site. This approach recognizes that the placement of buried utilities is influenced by frost line depths that vary by geographical region. Attachment 2 presents frost line depths for the regions of the contiguous United States. At a minimum, hand excavation depths must be at least to the frost line depth (see Attachment 2) plus two (2) feet, but never less than 4 feet below ground surface (bgs). For hand excavation, the hole created must be reamed large enough to be at least the diameter of the drill rig auger or bit prior to drilling. For soil gas surveys, the survey probe shall be placed as close as possible to the cleared hand excavation. It is important to note that a post-hole digger must not be used in this type of hand excavation activity.

Tile Probe Surveys

For some soil types, site conditions, and excavation requirements, non-conductive tile probes may be used. A tile probe is a "T"-handled rod of varying lengths that can be pushed into the soil to determine if any obstructions exist at that location. Tile probes constructed of fiberglass or other nonconductive material are readily-available from numerous vendors. Tile probes must be performed to the same depth requirements as previously specified. As with other types of hand excavating activities, the use of a non-conductive tile probe, should always be in conjunction with suitable utility locating detection equipment.

7.0 INTRUSIVE ACTIVITIES SUMMARY

The following list summarizes the activities that must be performed prior to beginning subsurface activities:

1. Map and mark all subsurface locations and excavation boundaries using white paint or markers specified by the client or property owner.

2. Notify the property owner and/or client that the locations are marked. At this point, drawings of locations or excavation boundaries shall be provided to the property owner and/or client so they may initiate (if applicable) utility clearance.

   Note: Drawings with confirmed locations should be provided to the property owner and/or client as soon as possible to reduce potential time delays.

3. Notify "One Call" service. If possible, arrange for an appointment to show the One Call representative the surface locations or excavation boundaries in person. This will provide a better location designation to the utilities they represent. You should have additional drawings should you need to provide plot plans to the One Call service.

4. Implement supplemental utility detection techniques as necessary and appropriate to conform utility locations or the absence thereof.

5. Complete Attachment 3, Utility Clearance Form. This form should be completed for each excavation location. In situations where multiple subsurface locations exist within the close proximity of one another, one form may be used for multiple locations provided those locations are noted on the Utility Clearance Form. Upon completion, the Utility Clearance Form and revised/annotated utility location map becomes part of the project file.

8.0 REFERENCES

OSHA Letter of Interpretation, Mr. Joseph Caldwell, Attachment 4
OSHA 29 CFR 1926(b)(2)
OSHA 29 CFR 1926(b)(3)
TtNUS Utility Locating and Clearance Policy
TtNUS SOP GH-3.1; Resistivity and Electromagnetic Induction
TtNUS SOP GH-3.2; Magnetic and Metal Detection Surveys
TtNUS SOP GH-3.4; Ground-penetrating Radar Surveys

ATTACHMENT 1
LISTING OF UNDERGROUND UTILITY CLEARANCE RESOURCES

American Public Works Association
2345 Grand Boulevard, Suite 500, Kansas City, MO 64108-2625
Phone (816) 472-6100 • Fax (816) 472-1610
Web www.apwa.net • E-mail apwa@apwa.net

ONE-CALL SYSTEMS INTERNATIONAL CONDENSED DIRECTORY

Alabama
Alabama One-Call
1-800-292-8525

Alaska
Locate Call Center of Alaska, Inc.
1-800-478-3121

Arizona
Arizona Blue Stake
1-800-782-5348

Arkansas
Arkansas One Call System, Inc.
1-800-482-8998

California
Underground Service Alert North
1-800-227-2600
Underground Service Alert of Southern California
1-800-227-2600

Colorado
Utility Notification Center of Colorado
1-800-922-1987

Connecticut
Call Before You Dig
1-800-922-4455

Delaware
Miss Utility of Delmarva
1-800-282-8555

Florida
Sunshine State One-Call of Florida, Inc.
1-800-432-4770

Georgia
Underground Protection Center, Inc.
1-800-282-7411

Hawaii
Underground Service Alert North
1-800-227-2600

Idaho
Dig Line Inc.
1-800-342-1585
Kootenai County One-Call
1-800-428-4950
Shoshone - Benewah One-Call
1-800-398-3285

Illinois
JULIE, Inc.
1-800-892-0123
Digger (Chicago Utility Alert Network)
312-744-7000

Indiana
Indiana Underground Plant Protection Service
1-800-382-5544

Iowa
Iowa One-Call
1-800-292-8989

Kansas
Kansas One-Call System, Inc.
1-800-344-7233

Kentucky
Kentucky Underground Protection Inc.
1-800-752-6007

Louisiana
Louisiana One Call System, Inc.
1-800-272-3020

Maine
Dig Safe System, Inc.
1-888-344-7233

Maryland
Miss Utility
1-800-257-7777
Miss Utility of Delmarva
1-800-282-8555

Massachusetts
Dig Safe System, Inc.
1-888-344-7233

Michigan
Miss Dig System, Inc.
1-800-482-7171

Minnesota
Gopher State One Call
1-800-252-1166

Mississippi
Mississippi One-Call System, Inc
1-800-227-6477

Missouri
Missouri One-Call System, Inc.
1-800-344-7483

Montana
Utilities Underground Protection Center
1-800-424-5555
Montana One Call Center
1-800-551-8344

Nebraska
Diggers Hotline of Nebraska
1-800-331-5666

Nevada
Underground Service Alert North
1-800-227-2600

New Hampshire
Dig Safe System, Inc.
1-888-344-7233

New Jersey
New Jersey One Call
1-800-272-1000

New Mexico
New Mexico One Call System, Inc.
1-800-321-2537
Las Cruces- Dona Ana Blue Stakes
1-888-526-0400

New York
Dig Safely New York
1-800-962-7962
New York City- Long Island One Call Center
1-800-272-4480

North Carolina
The North Carolina One-Call Center, Inc.
1-800-632-4949

North Dakota
North Dakota One-Call
1-800-795-0555

Ohio
Ohio Utilities Protection Service
1-800-362-2764
Oil & Gas Producers Underground Protect'n Svc
1-800-925-0988

Oklahoma
Call Okie
1-800-522-6543

Oregon
Oregon Utility Notification Center/One Call Concepts
1-800-332-2344

Pennsylvania
Pennsylvania One Call System, Inc.
1-800-242-1776

Rhode Island
Dig Safe System, Inc.
1-888-344-7233

South Carolina
Palmetto Utility Protection Service Inc.
1-888-721-7877

South Dakota
South Dakota One Call
1-800-781-7474

Tennessee
Tennessee One-Call System, Inc.
1-800-351-1111

ATTACHMENT 1 (Continued)

Texas
Texas One Call System
1-800-245-4545
Texas Excavation Safety System, Inc.
1-800-344-8377
Lone Star Notification Center
1-800-669-8344

Utah
Blue Stakes of Utah
1-800-662-4111

Vermont
Dig Safe System, Inc.
1-888-344-7233

Virginia
Miss Utility of Virginia
1-800-552-7001
Miss Utility (Northern Virginia)
1-800-257-7777

Washington
Utilities Underground Location Center
1-800-424-5555
Northwest Utility Notification Center
1-800-553-4344
Inland Empire Utility Coordinating Council
509-456-8000

West Virginia
Miss Utility of West Virginia, Inc.
1-800-245-4848

Wisconsin
Diggers Hotline, Inc.
1-800-242-8511

Wyoming
Wyoming One-Call System, Inc.
1-800-348-1030
Call Before You Dig of Wyoming
1-800-849-2476

District of Columbia
Miss Utility
1-800-257-7777

Alberta
Alberta One-Call Corporation
1-800-242-3447

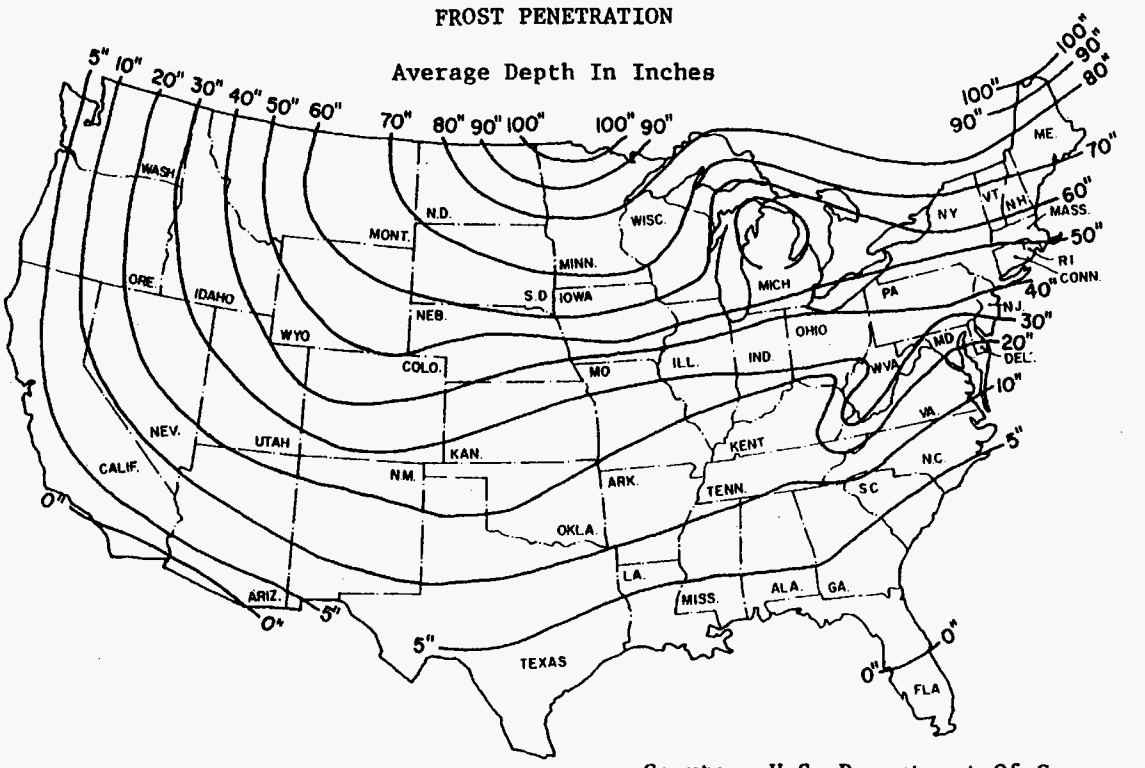
British Columbia
BC One Call
1-800-474-6886

Ontario
Ontario One-Call System
1-800-400-2255

Quebec
Info-Excavation
1-800-663-9228

ATTACHMENT 2

FROST LINE PENETRATION DEPTHS BY GEOGRAPHIC LOCATION



Courtesy U.S. Department Of Commerce

ATTACHMENT 3
UTILITY CLEARANCE FORM

Client: _____ Project Name: _____

Project No.: _____ Completed By: _____

Location Name: _____ Work Date: _____

Excavation Method/Overhead Equipment: _____

			Circle One
1.		Underground Utilities	
	a)	Review of existing maps?	yes no N/A
	b)	Interview local personnel?	yes no N/A
	c)	Site visit and inspection?	yes no N/A
	d)	Excavation areas marked in the field?	yes no N/A
	e)	Utilities located in the field?	yes no N/A
	f)	Located utilities marked/added to site maps?	yes no N/A
	g)	Client contact notified Name _____ Telephone: _____ Date: _____	yes no N/A
	g)	State One-Call agency called? Caller: _____ Ticket Number: _____ Date: _____	yes no N/A
	h)	Geophysical survey performed? Survey performed by: _____ Method: _____ Date: _____	yes no N/A
	i)	Hand excavation performed (with concurrent use of utility detection device)? Completed by: _____ Total depth: _____ feet Date: _____	yes no N/A
	j)	Trench/excavation probed? Probing completed by: _____ Depth/frequency: _____ Date: _____	yes no N/A

			Present Absent
2.		Overhead Utilities	
	a)	Determination of nominal voltage	yes no N/A
	b)	Marked on site maps	yes no N/A
	c)	Necessary to lockout/insulate/re-route	yes no N/A
	d)	Document procedures used to lockout/insulate/re-route	yes no N/A
	e)	Minimum acceptable clearance (SOP Section 5.2): _____	

3. Notes:

_____

_____

_____

Approval:

_____ _____

Site Manager/Field Operations Leader Date

c: PM/Project File
Program File

ATTACHMENT 4
OSHA LETTER OF INTERPRETATION

Mr. Joseph Caldwell
Consultant
Governmental Liaison
Pipeline Safety Regulations
211 Wilson Boulevard
Suite 700
Arlington, Virginia 22201

Re: Use of hydro-vacuum or non-conductive hand tools to locate underground utilities.

Dear Mr. Caldwell:

In a letter dated July 7, 2003, we responded to your inquiry of September 18, 2002, regarding the use of hydro-vacuum equipment to locate underground utilities by excavation. After our letter to you was posted on the OSHA website, we received numerous inquiries that make it apparent that aspects of our July 7 letter are being misunderstood. In addition, a number of industry stakeholders, including the National Utility Contractors Association (NUCA), have provided new information regarding equipment that is available for this work.

To clarify these issues, we are withdrawing our July 7 letter and issuing this replacement response to your inquiry.

Question: *Section 1926.651 contains several requirements that relate to the safety of employees engaged in excavation work. Specifically, paragraphs (b)(2) and (b)(3) relate in part to the safety of the means used to locate underground utility installations that, if damaged during an uncovering operation, could pose serious hazards to employees.*

Under these provisions, what constitutes an acceptable method of uncovering underground utility lines, and further, would the use of hydro-vacuum excavation be acceptable under the standard?

Answer

Background

Two sections of 29 CFR 1926 Subpart P (Excavations), 1926.651(Specific excavation requirements), govern methods for uncovering underground utility installations. Specifically, paragraph (b)(2) states:

> When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours * * * or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used. (emphasis added).

Paragraph (b)(3) provides:

ATTACHMENT 4 (Continued)

> When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means. (emphasis added).

Therefore, "acceptable means" must be used where the location of the underground utilities have not been identified by the utility companies and detection equipment is not used.

Subpart P does not contain a definition of either "other acceptable means" or "safe and acceptable means." The preambles to both the proposed rule and the final rule discussed the rationale behind the wording at issue. For example, the preamble to the proposed rule, 52 Fed. Reg. 12301 (April 15, 1987), noted that a 1972 version of this standard contained language that specified "careful probing or hand digging" as the means to uncover utilities. The preamble then noted that an amendment to the 1972 standard later deleted that language "to allow other, *equally effective means* of locating such installations." The preamble continued that in the 1987 proposed rule, OSHA again proposed using language in section (b)(3) that would provide another example of an acceptable method of uncovering utilities that could be used *where the utilities have not been marked and detection equipment is not being used* – "probing with hand-held tools." This method was rejected in the final version of 29 CFR 1926. As OSHA explained in the preamble to the final rule, 54 Fed. Reg. 45916 (October 31, 1989):

> OSHA received two comments * * * and input from ACCSH [OSHA's Advisory Committee on Construction Safety and Health] * * * on this provision. All commenters recommended dropping 'such as probing with hand-held tools' from the proposed provision, because this could create a hazard to employees by damaging the installation or its insulation.

In other words, the commenters objected to the use of hand tools being used unless detection equipment was used in conjunction with them. OSHA then concluded its discussion relative to this provision by agreeing with the commentators and ultimately not including any examples of "acceptable means" in the final provision.

Non-conductive hand tools are permitted

This raises the question of whether the standard permits the use of hand tools alone -- without also using detection equipment. NUCA and other industry stakeholders have recently informed us that non-conductive hand tools that are appropriate to be used to locate underground utilities are now commonly available.

Such tools, such as a "shooter" (which has a non-conductive handle and a snub nose) and non-conductive or insulated probes were not discussed in the rulemaking. Since they were not considered at that time, they were not part of the class of equipment that was thought to be unsafe for this purpose. Therefore, we conclude that the use of these types of hand tools, when used with appropriate caution, is an "acceptable means" for locating underground utilities.

ATTACHMENT 4 (Continued)

Hydro-vacuum excavation

It is our understanding that some hydro-vacuum excavation equipment can be adjusted to use a minimum amount of water and suction pressure. When appropriately adjusted so that the equipment will not damage underground utilities (especially utilities that are particularly vulnerable to damage, such as electrical lines), use of such equipment would be considered a "acceptable means" of locating underground utilities. However, if the equipment cannot be sufficiently adjusted, then this method would not be acceptable under the standard.

Other technologies

We are not suggesting that these are the only devices that would be "acceptable means" under the standard. Industry stakeholders have informed us that there are other types of special excavation equipment designed for safely locating utilities as well.

We apologize for any confusion our July 7 letter may have caused. If you have further concerns or questions, please feel free to contact us again by fax at: U.S. Department of Labor, OSHA, Directorate of Construction, Office of Construction Standards and Compliance Assistance, fax # 202-693-1689. You can also contact us by mail at the above office, Room N3468, 200 Constitution Avenue, N.W., Washington, D.C. 20210, although there will be a delay in our receiving correspondence by mail.

Sincerely,

Russell B. Swanson, Director
Directorate of Construction

NOTE: OSHA requirements are set by statute, standards and regulations. Our interpretation letters explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. This letter constitutes OSHA=s interpretation of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. Also, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult OSHA's website at http://www.osha.gov.

ATTACHMENT III

EQUIPMENT INSPECTION CHECKLIST

Equipment Inspection Checklist for Drill Rigs

Company: _____ **Unit/Serial No#:** _____

Inspection Date: ____/____/____ **Time:** ____:____ **Equipment Type:** _____

(e.g., Drill Rigs Hollow Stem, Mud Rotary, Direct Push, HDD)

Project Name: _____ **Project No#:** _____

Yes	No	NA	Requirement	Comments
			Emergency Stop Devices	
☐	☐	☐	• Emergency Stop Devices (At points of operation)	
☐	☐	☐	• Have all emergency shut offs identified been communicated to the field crew?	
☐	☐	☐	• Has a person been designated as the Emergency Stop Device Operator?	
			Highway Use	
☐	☐	☐	• Cab, mirrors, safety glass?	
☐	☐	☐	• Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?	
☐	☐	☐	• Seat Belts?	
☐	☐	☐	• Is the equipment equipped with audible back-up alarms and back-up lights?	
☐	☐	☐	• Horn and gauges	
☐	☐	☐	• Brake condition (dynamic, park, etc.)	
☐	☐	☐	• Tires (Tread) or tracks	
☐	☐	☐	• Windshield wipers	
☐	☐	☐	• Exhaust system	
☐	☐	☐	• Steering (standard and emergency)	
☐	☐	☐	• Wheel Chocks?	
☐	☐	☐	• Are tools and material secured to prevent movement during transport? Especially those within the cab?	
☐	☐	☐	• Are there flammables or solvents or other prohibited substances stored within the cab?	
☐	☐	☐	• Are tools or debris in the cab that may adversely influence operation of the vehicle (in and around brakes, clutch, gas pedals)	

Unit/Serial No#:_____ **Inspection Date:** ____/____/____

Yes	No	NA	Requirement	Comments
			Fluid Levels:	
☐	☐	☐	• Engine oil	
☐	☐	☐	• Transmission fluid	
☐	☐	☐	• Brake fluid	
☐	☐	☐	• Cooling system fluid	
☐	☐	☐	• Hoses and belts	
☐	☐	☐	• Hydraulic oil	
			High Pressure Hydraulic Lines	
☐	☐	☐	• Obvious damage	
☐	☐	☐	• Operator protected from accidental release	
☐	☐	☐	• Coupling devices, connectors, retention cables/pins are in good condition and in place	
			Mast Condition	
☐	☐	☐	• Structural components/tubing	
☐	☐	☐	• Connection points	
☐	☐	☐	• Pins	
☐	☐	☐	• Welds	
☐	☐	☐	• Outriggers	
☐	☐	☐	• Operational	
☐	☐	☐	• Plumb (when raised)	
			Hooks	
☐	☐	☐	• Are the hooks equipped with Safety Latches?	
☐	☐	☐	• Does it appear that the hook is showing signs of wear in excess of 10% original dimension?	
☐	☐	☐	• Is there a bend or twist exceeding 10% from the plane of an unbent hook?	
☐	☐	☐	• Increase in throat opening exceeding 15% from new condition	
☐	☐	☐	• Excessive nicks and/or gouges	
☐	☐	☐	• Clips	
☐	☐	☐	• Number of U-Type (Crosby) Clips (cable size 5/16 – 5/8 = 3 clips minimum) (cable size 3/4 – 1 inch = 4 clips minimum) (cable size 1 1/8 – 1 3/8 inch = 5 clips minimum)	

Unit/Serial No#:_____ **Inspection Date:** ____/____/____

Yes	No	NA	Requirement	Comments
☐	☐	☐	Power cable and/or hoist cable • Reduction in Rope diameter π (5/16 wire rope>1/64 reduction nominal size -replace) (3/8 to 1/2 wire rope>1/32 reduction nominal size-replace) (9/16 to 3/4 wire rope>3/64 reduction nominal size-replace)	
☐	☐	☐	• Number of broken wires (6 randomly broken wires in one rope lay) (3 broken wires in one strand)	
☐	☐	☐	• Number of wire rope wraps left on the Running Drum at nominal use (≥3 required)	
☐	☐	☐	- Lead (primary) sheave is centered on the running drum	
☐	☐	☐	• Lubrication of wire rope (adequate?)	
☐	☐	☐	• Kinks, bends – Flattened to > 50% diameter	
☐	☐	☐	Hemp/Fiber rope (Cathead/Split Spoon Hammer) • Minimum ¾; maximum 1 inch rope diameter (Inspect for physical damage)	
☐	☐	☐	• Rope to hammer is securely fastened	
☐	☐	☐	Safety Guards – • Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact?	
☐	☐	☐	• Hot pipes and surfaces exposed to accidental contact?	
☐	☐	☐	• High pressure lines	
☐	☐	☐	• Nip/pinch points	
☐	☐	☐	Operator Qualifications • Does the operator have proper licensing where applicable, (e.g., CDL)?	
☐	☐	☐	• Does the operator, understand the equipment's operating instructions?	
☐	☐	☐	• Is the operator experienced with this equipment?	
☐	☐	☐	• Is the operator 21 years of age or more?	

Unit/Serial No#:_____ **Inspection Date:** ____/____/____

Yes	No	NA	Requirement	Comments
☐	☐	☐	PPE Required for Drill Rig Exclusion Zone • Hardhat	
☐	☐	☐	• Safety glasses	
☐	☐	☐	• Work gloves	
☐	☐	☐	• Chemical resistant gloves_____	
☐	☐	☐	• Steel toed Work Boots	
☐	☐	☐	• Chemical resistant Boot Covers	
☐	☐	☐	• Apron	
☐	☐	☐	• Coveralls Tyvek, Saranex, cotton)_____	
☐	☐	☐	Other Hazards • Excessive Noise Levels? _____dBA	
☐	☐	☐	• Chemical hazards (Drilling supplies - Sand, bentonite, grout, fuel, etc.)	
☐	☐	☐	- MSDSs available?	
☐	☐	☐	• Will On-site fueling occur	
☐	☐	☐	- Safety cans available?	
☐	☐	☐	- Fire extinguisher (Type/Rating -_____ _ _____)	

Approved for Use ☐ Yes ☐ No ☐ See Comments

_____ _____

Site Health and Safety Officer Operator

ATTACHMENT IV

SAFE WORK PERMITS

SAFE WORK PERMIT
DECONTAMINATION ACTIVITIES
NAS PENSACOLA, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. **Work limited to the following (description, area, equipment used):** Decontamination of MacroCore Samplers (or similar equipment) drive rods, associated sampling equipment typically occurs within 5-gallon buckets or other portable containers (soap and water wash and rinse). Typically only the acetate liner and the cutting shoe actually contact the sample media.

II. **Primary Hazards:** Potential hazards associated with this task may include lifting (strain/muscle pulls lifting heavy drilling equipment; Stacked equipment - falling hazards; slips, trips, and falls – slippery surfaces; Pinches and compressions breaking open the sampler getting fingers and hands caught between hard surfaces and wrenches, etc.. The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards.

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☒ No Initials of Inspector _____TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: None anticipated

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
Liquinox (soap)	None Required	None	Eye irritant/flush with clean water
BTEX/PAHs/Lead	No monitoring required	None	Exposure not anticipated

Primary Route of Exposure/Hazard: Soap – Contact - eye irritant; ingestion- nausea possible vomiting, diarrhea; BTEX/PAHs – irritating at all points of contact; ingestion nausea, vomiting, diarrhea; Inhalation - central nervous system effects through inhalation include headaches, dizziness, nausea, drowsiness, anesthesia, loss of reflexes, and convulsions. Target organs include the kidneys, lungs, neurological effects. Chronic or repeated exposures may result in defatting of the skin and dermatitis. Metals – Lead – Ingestion/Inhalation – Metallic taste in the mouth, dry throat, abdominal pain, nausea, vomiting, diarrhea or constipation may occur resulting in bloody/black stool. Fatigue Hypotension, fatigue may result from acute or chronic exposures. Chronic exposure to this compound may also result in anorexia, malnutrition, and insomnia.

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes ☒ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☒ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☒ No
Splash Shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☒ No	Gloves (Type – Nitrile)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☐ No	Work/rest regimen	☐ Yes ☒ No
Steel toe Work shoes or boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☒ No
High Visibility vest	☐ Yes ☒ No	Tape up/use insect repellent	☒ Yes ☐ No
First Aid Kit	☒ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☒ No	Other	☐ Yes ☐ No

Modifications/Exceptions: Gloves – Nitrile (surgeons style) or nitrile type outer gloves for deconning associated sampling equipment. Impermeable apron at SSO's discretion.

VIII. Site Preparation	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc)	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Suspend site activities in the event of inclement weather (storms, high winds,etc.). Employ proper lifting techniques as described on Table 5-1 for Mobilization/Demobilization. Follow directions provided in the MSDSs for any decontamination solvents/solutions used in the decontamination procedure.

Permit Issued by:_____ Permit Accepted by:_____

SAFE WORK PERMIT
MOBILIZATION/DEMOBILIZATION ACTIVITIES
NAS PENSACOLA, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. **Work limited to the following (description, area, equipment used):** Mobilization and demobilization activities. These activities include site reconnaissance/site characterization, site preparation including the layout of sampling locations, securing the necessary utility clearances, and identifying/isolating physical hazards; Secure, construct, or equip IDW storage facilities to support the field activities.

II. **Primary Hazards:** Potential hazards associated with this task are primarily physical in nature including lifting, cuts and lacerations, pinches and compressions; flying projectiles; slips, trips, and falls; insect and animal bites. The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards.

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____ TtNUS
Equipment Inspection required ☒ Yes ☐ No Initials of Inspector _____ TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. **Protective equipment required** Level D ☒ Level B ☐

Respiratory equipment required Yes ☐ See Reverse / No ☒

Modifications/Exceptions: None anticipated

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
None anticipated	NA	NA	NA

Primary Route of Exposure/Hazard: None

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☐ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☐ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☒ No	Gloves (Type – Leather/Cotton)	☐ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☒ No
Steel toe Work shoes or boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☒ No
High Visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☒ Yes ☐ No
First Aid Kit	☒ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☒ No	Other	☐ Yes ☐ No

Modifications/Exceptions: If there are Flying projectiles – Safety glasses and/or splash shield; If you have to raise your voice to be heard by someone within 2-feet of you hearing protection is required (i.e., equipment/power tool operation); If overhead hazards or bump hazards or you are working near operating equipment hard hats will be employed. If you are working in or near traffic patterns then wear High Visibility Vests. Snake chaps will be required on the initial site characterization in remote/unmaintained areas.

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.)... ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Suspend site activities in the event of inclement weather. Employ proper lifting techniques as described on Table 5-1 for this task.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
MULTI-MEDIA SAMPLING ACTIVITIES
NAS PENSACOLA, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Multi-media sampling includes soil sampling collected using a MacroCore Sampler and disposable trowels; Monitoring well development/groundwater sampling using peristaltic pumps.

II. Primary Hazards: Potential hazards associated with this task include lifting (buckets of purge waters and moving drums), cuts and lacerations (cutting tubing/acetate liners), pinches and compressions opening MacroCore Samplers and handling containers); contact with contaminated media. The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Inspector Initials _____ TtNUS
Equipment Inspection required ☐ Yes ☒ No Inspector Initials _____ TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ See Reverse
No ☒

Modifications/Exceptions: _____

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
BTEX components	PID/FID	5 ppm in BZ sustained	Suspend site activities until readings subside
Dusts	Visual	> 2mg/kg	Area Wetting - dust suppression

Primary Route of Exposure/Hazard: **BTEX/PAHs** – irritating at all points of contact; ingestion nausea, vomiting, diarrhea; Inhalation - The central nervous system effect through inhalation includes headaches, dizziness, nausea, drowsiness, anesthesia, loss of reflexes, and convulsions. Target organs include the kidneys, lungs, neurological effects. Chronic or repeated exposures may result in defatting of the skin and dermatitis. **Metals – Lead** – Ingestion/Inhalation – Metallic taste in the mouth, dry throat, abdominal pain, nausea, vomiting, diarrhea or constipation may occur resulting in bloody/black stool. Fatigue Hypotension, fatigue may result from acute or chronic exposures. Chronic exposure to this compound may also result in anorexia, malnutrition, and insomnia,

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☐ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☒ No	Gloves (Type – Nitrile surgeons)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☐ No	Work/rest regimen	☐ Yes ☒ No
Steel toe Work shoes or boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☐ No
High Visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☒ Yes ☐ No
First Aid Kit	☒ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☒ No	Other	☐ Yes ☐ No

Modifications/Exceptions: Hard hat, hearing protection, and safety glasses for sampling at the DPT rig or within the established exclusion zones for soil boring and monitoring well installation; High Visibility Vests for high traffic areas; Tape up and use insect repellent to combat insect bites, as necessary; Spiders and bees prefer well protective casings as nesting areas; Open wells and allow to vent/off gas 3-5 minutes while preparing your equipment from an upwind position. Boot covers at SSO discretion....

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Cleared and Established	☐	☐	☐
Physical Hazards Barricaded and Isolated	☐	☐	☐
Emergency Equipment Staged	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Personal sampling at remote locations will bag contaminated PPE and reusable sampling tools and using hygienic wipes for hands and face until persons can reach the structured decontamination unit. Minimize contact with potentially contaminated media. Suspend site activities in the event of inclement weather. Employ proper lifting techniques as described on Table 5-1 for mobilization/demobilization. For remote locations pack glass ware in hard sided containers to prevent possible lacerations due to falls and breakage of glassware. Provisions for protection against the sun should be provided to site personnel including shade providing devices, hats, sun block, wrap around sun glasses.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
MONITORING WELL INSTALLATION/SOIL BORING ACTIVITIES
NAS PENSACOLA, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. **Work limited to the following (description, area, equipment used):** Monitoring wells will be installed using DPT/Disposable tip. Subsurface soil boring samples will be acquired using DPT and MacroCore Samplers or similar equipment to continuously sample. Personnel participating in this activity will be required to meet the requirements of both the Safe Work Permit for Multi-media sampling and this Safe Work Permit, Monitoring well installation/soil boring activities.

II. **Primary Hazards:** Potential hazards associated with this task include lifting hazards; cuts and lacerations (cutting bags, well riser, etc.), pinches and compressions (when opening MacroCore samplers and continuous tubing for well installation, wrenches slipping, etc.) and handling containers; pressurized systems (hydraulic lines; contact with contaminated media. The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards.

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Inspector Initials _____TtNUS
Equipment Inspection required ☒ Yes ☐ No Inspector Initials _____TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ See Reverse
No ☒

Modifications/Exceptions: _____

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
BTEX components	PID/FID	5 ppm in BZ sustained	Suspend site activities until readings subside
Dusts	Visual	> 2mg/kg	Area Wetting - dust suppression

Primary Route of Exposure/Hazard: **BTEX/PAHs** – irritating at all points of contact; ingestion nausea, vomiting, diarrhea; Inhalation - The central nervous system effect through inhalation includes headaches, dizziness, nausea, drowsiness, anesthesia, loss of reflexes, and convulsions. Target organs include the kidneys, lungs, neurological effects. Chronic or repeated exposures may result in defatting of the skin and dermatitis. **Metals – Lead** – Ingestion/Inhalation – Metallic taste in the mouth, dry throat, abdominal pain, nausea, vomiting, diarrhea or constipation may occur resulting in bloody/black stool. Fatigue Hypotension, fatigue may result from acute or chronic exposures. Chronic exposure to this compound may also result in anorexia, malnutrition, and insomnia,

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**(Note to FOL and/or SHSO: Each item must be checked Yes or No)

Hard-hat ☒ Yes ☐ No		Hearing Protection (Plugs/Muffs) ☒ Yes ☐ No	
Safety Glasses ☒ Yes ☐ No		Safety belt/harness ☐ Yes ☒ No	
Chemical/splash goggles ☐ Yes ☒ No		Radio/Cellular Phone ☐ Yes ☐ No	
Splash Shield ☐ Yes ☒ No		Barricades ☒ Yes ☐ No	
Splash suits/coveralls ☐ Yes ☒ No		Gloves (Type – See Note) ☒ Yes ☐ No	
Impermeable apron ☐ Yes ☒ No		Work/rest regimen ☐ Yes ☒ No	
Steel toe Work shoes or boots ☒ Yes ☐ No		Chemical Resistant Boot Covers ☐ Yes ☐ No	
High Visibility vest ☐ Yes ☐ No		Tape up/use insect repellent ☒ Yes ☐ No	
First Aid Kit ☒ Yes ☐ No		Fire Extinguisher ☒ Yes ☐ No	
Safety Shower/Eyewash ☒ Yes ☐ No		Other ☐ Yes ☐ No	

Modifications/Exceptions: High Visibility Vests for high traffic areas; Tape up and use insect repellent to combat insect bites in forested or areas of heavy vegetation, grassy areas; Fire extinguisher for all vehicles in excess of 1-ton; Nitrile or neoprene supported gloves for handling contaminated drill stems/flights, nitrile surgeon gloves for handling sampling tools and well screens and risers. Impermeable boot covers at SSO's discretion.

VIII. Site Preparation	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Cleared and Established	☐	☐	☐
Physical Hazards Barricaded and Isolated	☐	☐	☐
Emergency Equipment Staged	☐	☐	☐

IX. **Additional Permits required** (Utility Locating and Excavation Clearance – Attachment II)... ☒ Yes ☐ No
If yes, SHSO complete permit or contact Health Sciences, Pittsburgh Office (412) 921-7090

X. **Special instructions, precautions:** Follow the safe work practices for drilling specified in Section 5.8 of this HASP. Use proper lifting techniques defined in Table 5-1 for mobilization/demobilization. Personnel decontamination will consist of disposing of single use PPE and washing hands and face (or using hygienic wipes) prior to breaks or meals. The potential for exposure can occur through inhalation or hand to mouth contact (ingestion) through poor work hygiene practices. Utility clearance will precede all intrusive operations.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
IDW MANAGEMENT ACTIVITIES
NAS PENSACOLA, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. **Work limited to the following (description, area, equipment used):** IDW management activities includes containerization, staging, monitoring for leaks of IDW accumulated wastes. Wastes types include soil cutting, purge and decontamination wash waters.

II. **Primary Hazards:** Potential hazards associated with this task are primarily physical in nature including lifting, pinches and compressions; flying projectiles; slips, trips, and falls. The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards.

IV. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ See Reverse
No ☒

Modifications/Exceptions: None anticipated

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
None anticipated	Not Required		

Primary Route of Exposure/Hazard: None

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☒ No
Safety Glasses	☐ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☒ No	Gloves (Type – Leather/Cotton)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☒ No
Steel toe Work shoes or boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☒ No
High Visibility vest	☐ Yes ☒ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☒ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☒ No	Other	☐ Yes ☐ No

Modifications/Exceptions: If you are using pneumatic/electric power to open drums – Safety glasses are required; If power equipment is employed to move drums or you are working near operating equipment hard hats will be employed.

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc)..	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.). ... ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Suspend site activities in the event of inclement weather. Employ proper lifting techniques as described on Table 5-1 for Mobilization/Demobilization. When/where possible use heavy equipment to move and place containers. When placing drums – Place the label and retention ring nut on the outside where it is readily visible. Place 4-drums to a pallet. Maintain a minimum distance of 4-feet between pallet rows. An IDW inventory shall be generated to provide the number of drums, contents, and volumes. This inventory should be provided to the facility contact

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT V

MEDICAL DATA SHEET

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all onsite personnel and visitors who are cleared and will enter defined areas of operation. The medical data sheets will be kept in a central location during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project: NAS Pensacola; CTO 0056, Site 22

Name: _____ Home Telephone: _____

Address: _____

_____

Age: _____ Height: _____ Weight: _____

Name of Next Kin: _____

Telephone Numbers: Home: _____ Work: _____ Cell: _____

Address _____

_____

Drug or other Allergies: _____

Particular Sensitivities: _____

Do You Wear Contacts? _____

Provide a Checklist of Previous Illnesses or Overexposure to Hazardous Chemicals Resulting in signs and symptoms of overexposure and/or the necessity for Medical Attention and/or First-aid: _____

_____

Do you have any medical restrictions? _____

Past Medical History/Review of Systems (Check if you have had positive history)

- ☐ Heart Conditions (Chest pains, angina, heart attacks)
- ☐ Gastrointestinal Conditions (Ulcers, liver, GI Bleeding)
- ☐ Pulmonary(Difficulty in breathing, coughing, asthma, pneumonia)
- ☐ Neurological [Headaches, dizziness, strokes (CVA, TIA)]
- ☐ Kidney/Urological Disorder (kidney stones, renal failure)
- ☐ Endocrine (Thyroid, diabetes)
- ☐ Hematological (Clotting, anemia)
- ☐ Cancer
- ☐ Muscular/Skeleton (Arthritis, Fractures, etc.)
- ☐ Other (Recent Illnesses, weight loss, fever, etc.)

Comments: (Please explain positive indications): _____

_____

Immunization History: Last Tetanus Shot or Booster (Date): _____ Pneumonia Vaccination (Date): _____

Flu Vaccination (Date): _____ Other: _____

Name, Address, and Phone Number of personal physician: _____

_____

_____

I am the individual described above. I have read and understand this HASP.

_____ _____

Signature Date